Secrets of the Hidden Vessels

Explains how Chinese acupuncture works
in terms Western readers can understand

Academic Edition

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This book does not serve as a manual on how to do acupuncture or acupressure. Such treatments, whether by needling, moxibustion, cupping or pressure, should always be performed by a qualified Chinese Medicine acupuncturist.

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Chapter 1. Introduction

A brief history of Chinese medicine

The early seeds of Chinese medicine can be traced back to the Shang Empire (1800-1600 BC). Like other early cultures around the world, at this period in China the belief was that illness was a state caused by the evil intentions of a third party, such as a curse from another person or from an ancestor, which then caused bad things to happen.[1] This could include physical signs or symptoms but also bad luck—and such bad luck was considered a part of the "illness". For example, a toothache was thought of as a "tooth illness" that was caused by a curse. A common remedy was to make an offering to the displeased ancestor to attempt to placate them and hence lift the curse.[2] And to this day, making offerings to ancestors remains culturally important in China, though the motivation is now more related to securing good luck for the family. In a similar way, another factor believed to cause illness was the wind, where the wind itself was thought of as having evil intentions.[3]

It was believed that each person had two souls, the "corporal soul" (the *po* 魄), which entered the body at birth and departed the body at death; and the "ethereal soul" (the *hun* 魂), which entered the body some time after birth, could temporarily leave the body during periods of sleep, and after death wondered alone through space and time.[4] From about 770 BC, the early demonic medicine of China perceived these unattached souls (or spirits or demons) as inherently evil and constantly striving to hurt people.[5]

The earliest surviving record of needles being used in the context of "acupuncture" dates from the 5th century BC. Sun Ssu-miao cited the earlier physician Pien Chio, from the 5th century BC, who recommended the exact location of thirteen puncture points for the needle treatment of demon-related illnesses, the points being given names such as "demon camp", "demon hearts" and "demon hall".[6] This suggests that initially acupuncture may have been used in the context of expelling demons from the body.

In the closing years of the Chou period (481-221 BC, known as the Warring States period), less significance was given to the influence of dead ancestors, but illness (and misfortune) was still seen as being largely caused by demons. And shaman-like practi-

tioners, called *wu*, were used to exorcise the demons.[7]

The concept of "yin" and "yang"

During the last centuries of the Chou period (around the 4th century BC) there was a move by Chinese intellectuals to explain worldly phenomena as natural occurrences, without referring to mysterious forces such as gods or ancestors. Empirical evidence seemed to suggest that many phenomena in the world could be grouped into pairs, where opposing forces appeared to act between the pair, so that as one of the pair became stronger, the other became weaker—such as in the alternation between day and night. And the principle could be applied to every physical and functional aspect of a person's body, including their organs. The terms *yin* 陰 and *yang* 陽 were used to describe these opposing forces—the terms originally meaning "shady side of a hill" and "sunny side of a hill" respectively (p.330).[8]

The five phase doctrine

Around the time that the *yin-yang* doctrine first appeared, a second natural philosophy that would influence Chinese medicine thinking was created, known as the five phases. Its creator is thought to be Tsou Yen (circa 350-270 BC),[9] who arranged natural phenomena into five categories, rather than two. According to Tsou's doctrine, all phenomena may exist in any one of five states, and these five states (or phases of existence) may transform into one another in an organized cycle, with the progress determined by one of several relationships that were thought to exist between the five phases. To name the phases, Tsou chose five natural substances: water, wood, fire, earth, and metal (p.255).

The Huang Di Nei Jing

Probably the oldest surviving document describing the comprehensive application of the *yin-yang* and five phase doctrines in Chinese medicine, is the *Huang Di Nei Jing* (The Yellow Emperor's Classic of Internal Medicine—*Nei Jing* for short). The document is a series of scrolls containing a collection of separate essays by different authors, the earliest probably dating back to the 2nd century BC.[10] The document is divided into two parts, the *Su Wen* and the *Ling Shu*, and these terms alone are usually now used to refer to these separate parts of the *Nei Jing*.

Already, by this early stage, the documents feature different schools of thought, each favouring either the five phase or the *yin-yang* doctrine; and even the *yin-yang* doctrine was also further divided into either four or six phases by some schools. There is clear disagreement between the differing schools, sometimes providing contradictory explanations for the same phenomena.[11] And the disagreements also extended to such subjects as the detail of each organ's role in metabolism (p.32).

The Nan Jing

Another important classic text is the *Nan Jing* (The Classic of Difficult Issues). This was compiled a few centuries after the *Nei Jing*, probably in the 1st or 2nd centuries AD,[12] and clarifies and expands upon many of the issues introduced in the *Nei Jing*.

The common foundations

Despite these differing doctrines and the disagreements in other areas, some of the knowledge described is common to every faction within Chinese medicine and has remained stable for over two thousand years. This is the knowledge gained from practical observation, rather than from theorizing, and includes

- the details of the main meridians and acupuncture points;
- the organs they relate to;
- the signs and symptoms produced when a particular organ is stressed;
- the facial colour, tone of voice, and scent also produced when each organ is stressed;
- the mental and emotional factors that impede our organ functions; and
- the lifestyle factors that promote either good or ill health.

All this knowledge was acquired over two thousand years ago and remains the same today.

The evolution of medical knowledge

In 1973, fourteen medical scripts were unearthed from the Ma-wang-tui graves near Hunan. The graves date back to 168 BC, and the scripts help to clarify some aspects of the evolution of medical knowledge leading up to the *Nei Jing*.

The *Ma-wang-tui* scripts describe only eleven main meridians which were said to flow *independently* of each other, and only four of them were said to be linked to internal organs. And it was considered that the signs and symptoms a patient suffered were associated with a certain meridian, and that it was the meridian itself that was ill, rather than the illness being associated with an organ. It was thought the illness consisted of either a deficiency or surplus of the contents of either the upper or lower section of the meridian.[13]

But by the time of the *Nei-jing*, the full twelve meridians were described, each connecting to a separate organ; and all the meridians were now known to flow *into* one another in a continuous cycle. It was now also recognised that the same signs and symptoms mentioned above were associated with an illnesses in a certain organ (rather than in a meridian), and that this was merely *reflected* in signs in the organ's related meridian (i.e. the "movement" of the organ's "influences" in the meridian).

The introduction of needles

It is also notable that the *Ma-wang-tui* scripts (pre 168 BC) contained no indication that needles could be used to puncture the various "holes" on the meridians to achieve therapeutic effects. Instead, the use of moxibustion (the burning on the skin of powdered mugwort plants) was recommended as the sole method for influencing the contents of the meridians. The earliest surviving documented account of the use of needles for therapeutic effect is in Ssu-ma Chien's biography (of 90 BC) of the earlier physician Shun-yu I. Legal documents survive recording two trials of Shun-yu I, in 167 and 154 BC. He was accused of malpractice due to his use of needles and asked to explain their use, which suggests the practice was unfamiliar to his accusers.[14]

By the time the *Nei Jing* was compiled, only shortly after Shun-Yu I's lifetime, acupuncture was adopted, in addition to moxibustion and blood letting, as the domi-

nant therapeutic technique. This suggests that the use of needles in acupuncture became widespread somewhere between the life of Shun-Yu I (around 160 BC) and the composition of the various chapters of the *Nei Jing*, very shortly after this.[15]

The terms used in Chinese medicine

The *Nei Jing* constitutes a sophisticated system that describes how our body works, becomes ill, and may be treated. Yet in ancient China, there was only a rudimentary knowledge of our body's internal anatomy. The dissection of corpses for medical education was not culturally acceptable, though it was still occasionally performed. [16] At that time though, this rudimentary knowledge of our internal anatomy was not sufficient to provide a physiological explanation for the signs and symptoms of ill health that the physicians observed (as recorded throughout the *Nei Jing*). Their ingenious solution was to instead devise a system of anatomy and physiology using the analogy of their state's administrative and military systems.[17]

The new administrative systems (emerging after the conclusion of the Warring States period) had to now organize, feed and manage large populations—in the newly unified, stable and peaceful China. And the collective population of a large state was seen as being analogous to a single person's body.

Grain fed the state and kept it alive, just as it does a person. There were massive storage facilities to store the grain, which were akin to the organs in a person's body that tended to store resources; hence the term *zang* 藏 was used to refer to such an organ, which is translated as "depot" or "long-term depot".

In the state, there were also centres of consumption, largely the palaces, where the grain was processed and consumed; and these were akin to a person's organs that tended to process the grain to extract the resources from it; hence the term *fu* 府 was used to refer to such an organ, which is translated as "palace" or "short-term repository".[18]

To allow the resources to be exchanged between the depots and palaces, they were linked by a system of transportation channels, or conduits, which were termed the *jing* 經 and *luo* 絡. The term *jing mai* 經脈 referred to the main vessels that linked every depot and palace, and translates as "conduit vessel". Today, these are usually known as either "meridians" or "channels". The term *luo mai* 絡脈 referred to the secondary vessels which were thought to branch off from the main vessels, and translates as "network vessel". Today, these are usually known as "collaterals" or sometimes "*luo* channels"[19] (all these terms are further clarified on page 29).

The term *jing* was a direct reference to the large rivers in China (*jing shui*) running from the mountains and into the countryside, bringing nourishment to the land.[20]

Irrigation played a vital role in China throughout its history. Authors from the 3rd to the 1st centuries BC stressed the importance of opening clogged waterways, draining floods, and irrigating the soil, to ensure the productivity (or health) of the land.[21] And these concepts were applied to our body, where it was seen as vitally important to keep the flow of substances through *its* conduits clear, which then ensured the health of the person; whereas any blockages in the conduits (meridians) were seen as being one of the major causes of illness.[22]

The *Nei Jing* texts abound with descriptions of how to identify the depletion or repletion in a particular organ (one of the *depots* or *palaces*) which is responsible for a health problem, and of the blockages in conduits or network vessels which give rise to pain or discomfort. And to this day, acupuncture treatments are often described as "dredging a meridian" to clear its flow—just as ditches are dredged to clear a problem in the health of the state.[23]

In our body, each of the organs (the *depots* and *palaces*) were considered to have a different function; and to characterize these functions, they were compared to those of the officials of state. Chapter 8 of the *Su Wen* describes them as follows.

The heart was equated to the ruler (or emperor); the lungs to a chancellor or mentor who functioned to provide order and moderation; the liver to a general who provided planning and deliberation; the gallbladder to a "rectifier" who was responsible for making decisions and judgements; the small intestine to the official who received "what had been perfected" and transformed it further; the large intestine to the official who "transmitted [things] along the way" thereby producing "changes and transformations"; and so on. And it was said that "…All these twelve officials must not lose contact with each other. Hence, if the ruler is enlightened, his subjects are in peace…. If the ruler is not enlightened, then the twelve officials are in danger. This causes the paths to be obstructed and impassable."[24]

Just as the state was protected from outside invaders by its military, so the body was seen as being protected in the same way. Pathogens (such as wind) may "hit" the body, and to protect us, our body possessed guards (*wei* 衛) who were responsible for fending off the attack. And, as in military strategy, when our body was weak, it was then that invaders would take advantage. And this same principle also applied inside our body. When any of our organs became weak, the other organs in a position to do so would take advantage and "subdue" (*ke* 克) their neighbours or "seize" (*sheng* 生) their territory.[25] According to the five phase doctrine, this notion produces the "control" (*ke*) and "generation" (*sheng*) sequences that were thought to exist between the organs (p.255).[26]

The *Nei Jing* was the first medical text to describe the workings of our body using the analogy of a state's administrative and military apparatus.[27] And other advances also included changed notions regarding pathogens and illness. Wind was still considered to be a major cause of illness, but it was no longer seen as having evil intent. The wind was simply one of several natural phenomena that could cause illness (as well as heat, cold, dampness and dryness), but it was not inevitable that you would fall ill when exposed to these pathogens; this depended on your body's ability to resist the pathogen, and was no longer down to mere fate.[28]

Over the two millennia since the compilation of the *Nei Jing*, Chinese physicians have argued over the meanings (and even the validity) of many passages. The most contentious issues have been the change to reading pulses only at a patient's wrist, rather than palpating certain locations on every meridian (p.291), and the application of the five phase doctrine to medicine (p.259).[29]

Through all this time, there have been separate schools of thought in acupuncture,

some choosing to apply only certain aspects of the *Nei Jing*, while others focus on other aspects; and this same approach exits today, with numerous different styles of acupuncture being practised. The fundamental knowledge tends to be the same in all schools (that is, the bullet points listed on page 15 above) and the main differences tend to be in the approach to forming a diagnosis, selecting the acupuncture points to use, and in needling technique.

Who invented acupuncture?

Today's acupuncture schools tend to refer back to the *Nei Jing* as the source of all key knowledge on the subject, which is understandable. This is how I was trained, and the ancient systems and terminology have a beauty and charm to them, and when applied in practice, acupuncture works as well today as it always has done. After all, the ancient Chinese invented acupuncture, so surely their writings convey the subject.

At first glance, this might appear so. But an important fact usually overlooked is that acupuncture is not manmade. It was not invented by the ancient Chinese, nor by anyone else. The phenomenon (that is, what happens in our body when an acupuncture point is stimulated, and how this affects our organs and other systems), this phenomenon has always been present in our body, and may even have been present from the earliest stages of evolution. It is said to exist in all life forms, including plants; and in an animal embryo, the *primo vascular system* (which the meridian system is a part of) is the first system to form, even before the vascular or nervous systems do, which then form *around* the primo vessels (p.315).

It is true that (according to the surviving texts) the ancient Chinese were the first to discover how to *activate* this acupuncture system. But the mechanisms in our body that are utilized have always been present, from millions of years before humans evolved; and the same mechanisms still exist in our bodies today—unchanged.

What the ancient Chinese *did* discover is the information in the bullet list on page 15 above; that is, the signs and symptoms each organ produces when stressed, the accompanying diagnostic signs, the meridian pathways, and the main causes of disease, including mental and emotional factors. All this information is fact based, since it was gained from practical observation, rather than from theorizing; and over two thousand years later, it still forms the core of Chinese acupuncture.

The challenges for acupuncturists today

The training of acupuncturists today is based on the *Nei Jing*, but apart from its fact-based core content, its other content is notoriously difficult to understand, since it is either metaphorical or uses theories that are incompatible with today's medical terminology—theories to attempt to explain how our body works, how people become ill and how acupuncture works to treat those illnesses. Apart from the challenge of understanding these theories, another big obstacle is that many of them (when compared with today's anatomy and physiology) are simply untrue, which only makes it even harder for them to be understood and accepted.

One way this book helps is by demonstrating how to determine which of the *Nei Jing* content is fact-based, which is metaphorical

and not intended to be interpreted literally, and which is simply untrue (Chapters 2 and 13).

This makes learning Chinese acupuncture easier, but when practising acupuncture, another great challenge then arises. How on earth do you explain to patients what their condition is and how acupuncture works to treat it? The entire vocabulary you learnt as an acupuncture student would be incomprehensible to them—and also to anyone outside of Chinese medicine.

However, since the phenomenon of acupuncture is a natural part of our body and was not invented by the ancient Chinese, it ought to be possible to explain it in relation to today's *anatomy and physiology*,* so that everyone can understand what it is, how it works, and what conditions it can treat. This is the other challenge undertaken by this book. It uses terms and concepts familiar to today's readers to explain how acupuncture works, to describe all the common health conditions treated by it, and their causes—including mental and emotional causes.

This makes the entire subject much easier to understand and learn, and enables acupuncturists to continue using any element of the *Nei Jing* to form a diagnosis and determine their approach to treatments, while using terms and concepts familiar to their patients to communicate about the patient's condition and any aspect of the treatment.

My journey in writing this book

In my early thirties, acupuncture transformed my health and life. The treatments were like nothing I had ever experienced and they had unexpected effects, rejuvenating my energy (overnight I felt like a nineteen-year-old again), and even appearing to awaken feelings and sensibilities within me which I had long since forgotten existed. After a few weeks, I was a different person.

Years later, I trained in Chinese acupuncture and started my own practice. I found the treatments routinely had the same dramatic effect on many of my patients, curing serious conditions they suffered for years and transforming their lives. Naturally, I felt the desire to spread the word to as many people as possible. But several obstacles stood in the way, the most significant being that it simply was not possible to tell patients how acupuncture works, nor to communicate this to other healthcare workers, scientists or the media.

Today we think about healthcare in terms of how our nervous system or the chemistry of our body communicates between our main organs, and we look for disruptions in these systems to explain our health problems. And we also rely entirely on the contemporary terms for diseases, whether or not we know what those terms mean. For example, the Greek suffix "-itis" is often added to the Latin or Greek term for a part of our body to indicate there is inflammation (swelling) in that area, giving us labels such as "tendonitis", "tonsillitis", "bronchitis", "appendicitis" and

* Note that when this term is used in this book, this is referring *only* to the scientific study of anatomy and physiology. It is not in any way referring to the pharmaceutical approach to healthcare, which is an entirely separate activity. That activity uses contemporary anatomy and physiology (as do many other disciplines), but this does not mean that contemporary anatomy and physiology *is* the pharmaceutical approach to healthcare. These two should not be confused, nor equated to one another.

so on. We are familiar with these terms and imagine they describe the condition—even though the terms merely mean there is swelling in a particular location. They do not in any way describe *why* there is swelling, and often the reason may not even be known. Or we may be told the problem is with the chemistry of our body—that perhaps there is an imbalance in our hormones. Whether or not this describes the cause of our problem, rather than being merely an indicator of it, does not matter. We are familiar with the concept, so we feel we understand it. This is the way we are used to thinking about our bodies and illness.

In contrast, as mentioned above, acupuncturists today are still trained using terms and concepts that originated in the *Nei Jing* (though they have often been modified or added to), so when talking about acupuncture, these are the terms acupuncturists tend to use. For example, I might say to a patient that their migraine symptoms are produced by "Liver chi stagnation" (a term used in today's Chinese medicine). To understand this, the patient would naturally attempt to convert the term into the concepts they were used to, and might imagine I was saying they had a liver disease of some sort. They might reply "But my doctor did a blood test last week which revealed no problem with my liver," and give me a puzzled look.

To clarify, I might then use a Chinese medicine concept to describe the disease mechanism and say something along the lines of: "The *yin* of your kidney is deficient, which means the *yang* of your liver is not restrained, enabling it to rise up into your head and produce your migraine symptoms." Again, the patient would attempt to convert this into the concepts they were used to, perhaps trying to imagine hormonal imbalances or physical abnormalities in their organs or bodily structures. But such Chinese medicine concepts do not ordinarily translate into the terms of contemporary anatomy and physiology, so the patient would, understandably, be left baffled.

During my student days I struggled with this same issue. As Western students of Chinese acupuncture, both I and my classmates spent the first few months of college struggling to comprehend the basic principles—since the *Nei Jing* concepts made no sense when we attempted to convert them into the contemporary medical terms we were used to. But after about six months of study, there came a time when it all started to make sense. To reach this epiphany, it was necessary to put out of my mind all the contemporary medical knowledge I had picked up throughout life, and regard Chinese medicine as a separate, entirely unrelated system. Only in this way was it possible to properly understand it. And once I started my own Chinese acupuncture practice, applying those ancient poetic concepts enabled me to successfully practise acupuncture today. However, it was not possible to explain to patients how acupuncture works, other than by using the ancient terminology, which only left them puzzled. And this same situation also means that other healthcare workers, scientists and the media currently have no idea what acupuncture is or how it works, which has generated much prejudice and widespread misunderstanding, even causing some people to claim the system has no physical effect and is an intricate hoax.

It was clear to me that acupuncture works (and had a far more powerful effect on my own health than any other healthcare system I

had tried), but even when trained as an acupuncturist, I still had no idea *how* it works—in terms of contemporary anatomy and physiology. What was physically happening in the patient's body during and after an acupuncture treatment? There was no explanation for this. And it was partly my burning desire to spread the word about acupuncture, and partly the need to satisfy my own insatiable curiosity that drove me to find an explanation.

My first few years of research were fruitless. I had a large store of unusual firsthand experiences to draw upon (some explained in this book), together with my experiences of the effects of acupuncture on patients and on myself, and of course knowledge of the *Nei Jing*. The task was to use contemporary medical concepts to devise an explanation of how acupuncture works, such that it accounted for all these experiences. I spent several years trying to imagine a control system, similar to our nervous or hormonal systems, or some way that acupuncture might interact with these systems. It seemed logical that acupuncture must do this since this is how we are used to thinking about how our body works. But none of the systems I devised seemed credible. Then one day I realized that acupuncture was not a control system at all. This enabled me to devise a simple, straightforward explanation of how it works, which accounted for every one of my firsthand experiences (the unusual as well as the routine ones which all patients and practitioners share) and was able to be explained using contemporary terms and concepts and could therefore be understood by everyone. I realized that instead of being a control system, acupuncture achieves its effects by utilizing the association that exists between each of our abdominal organs and specific locations on our body.[30]

It was known for well over two thousand years that when a person had a particular illness, there was always a very specific bodily location that became tender (one of the acupuncture points), and if this was stimulated, the illness cleared. But what was the mechanism that enabled this to happen?

As described throughout this book, the signs and symptoms of an illness are caused by the malfunction of an organ, due to the organ being stressed in some way. And due to the association that exists between that organ and a specific bodily location (a particular acupuncture point), the malfunction causes that location to become tender. By stimulating one of these tender locations, this same association is utilized but in reverse, which appears to encourage the associated organ to cancel out the malfunction in itself that caused the location to become tender. The organ function returns to normal and the signs and symptoms clear (Chapters 16 to 19 describe this hypothesis in detail).

The layout of this book

Chapter 2 describes the Chinese medicine notions of metabolism (how our organs transform the food we eat into useable resources), explaining which are fact based and which are untrue; and also explains and translates the key Chinese medicine terms, such as *chi* 氣.

Chapters 3 to 9 are dedicated to the individual organs, and describe the organ functions by referring to the practical observations of the *Nei Jing*, their notions of metabolism, and also comparing these with contemporary physiology, so that the key aspects of the Chi-

nese medicine organ systems and disease mechanisms can be clearly understood.

Chapters 10 and 11 cover painful meridian obstructions and the mental and emotional factors in causing disease.

Chapter 12 provides detailed case histories covering many common conditions, from diagnosis through to the outcome of the treatments; and these are referred to throughout the above organ chapters.

Chapter 13 describes which of the *Nei Jing* content is factual, which is metaphorical, and which is simply untrue. Many *Nei Jing* passages and theories are analysed, demonstrating an approach that can be used to identify the fact based content, so that students are then able to more fruitfully study the *Nei Jing* for themselves.

Chapters 14 and 15 discuss issues related to pulse diagnosis and the treatment of viral or bacterial infections.

Chapter 16 summarizes the scientific evidence for the structures that correspond to the meridians and acupuncture points, and also describes their physiological purpose.

Chapter 17 describes evidence related to our body's use of electrical energy—since this is thought to play a part in enabling acupuncture to achieve its effects.

Chapter 18 describes why the meridians and acupuncture points are located where they are, and also introduces the mechanism of *bio-symmetrical filtering*, which is related to the geometry of the meridians and is thought to be another key element that contributes to producing acupuncture's effects.

Chapter 19 describes how information about our organ functions is encapsulated in the electrical current that circulates our body. This current is thought to play a key role in the two-way communication between our organs and the acupuncture points, which then enables acupuncture to correct organ malfunctions. This hypothesis is described in detail and then compared with other hypotheses on how acupuncture works.

Chapter 2. Chinese medicine metabolism and physiology

Translation of key Chinese medicine terms

One of the commonest Chinese medicine terms is also one of the hardest concepts to translate into English. This is the term *chi* 氣. As suggested by Unschuld, this concept was used in Chinese medicine when it was moving away from the notion that demons were responsible for causing illness.[1] Instead it was now considered that environmental factors (such as wind, cold, or dampness) were responsible. These were referred to using the concept of *chi*. In this context, the term encompassed a range of ideas, such as: wind, breath, vapours, or the clouds in the sky. Its character 氣 is made up by placing the pictogram for "rising vapour" above the pictogram for "rice" or "millet", so that the entire character means "vapours rising from food". And these same "vapours" were also thought to be present in our body, either as a pathogen (such as the essence of "harmful wind" that had penetrated our skin) or as a nourishing element, such as the vapours extracted from the food we eat. The English translation of *chi* 氣 favoured by Unschuld is therefore "finest matter influences" or simply "influence".

This concept was depicted nicely by Yü Shu, writing in 1067 (more than a millennium after the *Nei Jing*), when he said that the influences passing from the lungs and heart "resemble mist gently flowing into all the meridians".[2]

As Unschuld points out, this concept is entirely different from our contemporary notion of "energy", which is how *chi* is often translated in today's Chinese medicine. But such a notion did not exist in ancient China and only obscures the term's intended meaning. For this reason, this book follows Unschuld's translation of *chi* as "influence", so as to more accurately capture the term's intended meaning.

How our body processes food

As mentioned above, the ancient Chinese had no concept of "energy" as we think of it today, yet they had intricate notions about how our food was converted by our organs to provide the resources our body needs.

Separating fact from metaphor and supposition

Some aspects of Chinese medicine were discovered through practical observation and are therefore fact based. But other aspects were created theoretically and tend to be either metaphorical, or based on unreliable suppositions about how our body might work—suppositions that were resorted to by necessity, since there was no useful information about our body's internal anatomy and physiology.

Their notions of how our organs transform food into useable resources are in the latter category. And when considered alongside today's fact-based knowledge of anatomy and physiology (as far as it has so far progressed), most of these ancient *Nei Jing* ideas are simply untrue.

On the other hand, the *Nei Jing* notions of the signs and symptoms that occur when any organ is stressed, these are all factual—since they were discovered through practical observation. And any other aspect of Chinese medicine similarly discovered tends to be factual. The metaphorical and unreliable (or more bluntly, "untrue") elements tend to be their theoretical explanations of *how* those signs and symptoms are produced. And when striving to understand Chinese medicine, it is important to be clear in your mind about which aspects are factual, metaphorical or untrue.

Overview of Chinese medicine metabolism

Food and liquids are taken in by our stomach, which extracts "food influence" from them. Our lungs then extract "clear influence" from the air to create a third type of vapour which nourishes our lungs and heart and enables them to carry out their functions.

Liquids are also extracted from our food and transformed into blood. In ancient China, there was no notion of a separate blood circulatory system, nor of our heart acting like a pump (p.42). Instead the meridian network was the only known circulatory system, so it was natural to assume that all substances circulated within it.[3] Therefore, the blood was thought to circulate within the meridians, while the various types of influence also travelled either within (along with the blood) or outside of the meridians, much like a vapour or mist encircling each meridian.

Once food influence was extracted by our stomach, it then divided into two parts. The food influence (like all other influence) was thought to be a vapour-like substance, and this contained some vapours that were more active and aggressive (the *yang* portion) and some that were more restful and supportive (the *yin* portion). The supportive portion of the vapour was known as "constructive influence" and this circulated within the meridians to every part of our body, having a nutritive action. Whereas the more active portion of the vapour was known as "defensive influence" and this circulated on the outside of the meridians and warmed our muscles and skin.

The purpose of the blood was seen as purely nutritive. The blood provided nutrition to every part of our body—our muscles, joints, and organs—which meant there were two factors that nourished our body, the blood and the constructive influence, both flowing together in the meridians.

External pathogens, known as "harmful wind"* or "uninvited guests", would enter our body through our skin. In form, these were similar to the vapours our digestion extracted from food and would travel through our body in the same way. The "defensive influence" had the role of warming our skin and muscles, and as long as our defensive influence was strong enough, then the harmful wind would not be able to penetrate our skin. But if a person's defensive influence was depleted, the harmful wind could penetrate. The wind (in the form of a "harmful vapour") would reach the meridians and lodge there, causing local discomfort. If not cleared by treatment, this "harmful vapour" would then travel along the meridians and eventually lodge within our organs, causing serious illness.[4]

There was also thought to be a constitutional influence (another type of vapour) which was passed on to us from our parents. It was thought to be stored in our kidneys† and circulated to our organs, so as to provide an extra vital stimulus that the organs need to function properly. This influence, while stored in our kidneys, may be supplemented each day by the vapours extracted from our food.

The Chinese terms for these various "influences"

The Chinese term for food influence is *gu chi* 穀氣. Alternative translations are "grain influence" or "valley influence".

The term for clear influence (extracted from the air we breathe) is *qing chi* 清氣.

The term *zong chi* 宗氣 refers to the influence formed in our lungs and heart. *Zong chi* is variously translated as "chest influence", "stem influence", "pectoral influence", or "gathering influence".

The term for constructive influence is *ying chi* 營氣, which is also translated as "nourishing influence" or "camp influence".

The term for defensive influence is *wei chi* 衛氣, which is also translated as "protective influence" or "guard influence".

The term used for the constitutional influence varied between different texts. In the *Su Wen* and the *Ling Shu*, the term *jing chi* 精氣 was used, which is translated as "essence influence"; or the term *jing* 精 was also used alone and is variously translated as "pure essence", "seminal essence", "congenital essence", "acquired essence", or simply "essence".[5] But in the slightly later *Nan Jing*, the term *yuan chi* 原氣 was now used, which is translated as "original influence" or "primary influence".

The above influences are present in the meridians, which circulate them; and when combined together they were known as "true influence". The Chinese term *zhen chi* 真氣 was used to describe true influence.[6]

The terms for body liquids

The "liquids" in our body were termed the *jin* 津 liquids and the *ye* 液 liquids. These were defined as follows.

* In the *Nei Jing*, a wind pathogen was known as "evil wind", where "evil" was simply understood to mean "harmful", rather than meaning that it had any intent of its own. But because the word "evil" now has other connotations, I think it is less misleading to translate it as "harmful".

† When the term "kidneys" is used in Chinese medicine, this refers to three structures collectively: they kidneys, adrenal glands, and gonads (p.143).

Extract from *Ling Shu*, Chapter 30

That which is released to flow out of the skin structures, when a person sweats profusely, that is what is called "*jin* liquid" ... When grains enter the body and fill it with the [influences], then a viscous liquid pours into the bones, enabling the [joints] to bend and stretch. The [influences] flow out to fill the brain with marrow and they provide the skin with dampness. That is what is called "*ye* liquid".[7]

Hence, the *jin* are the finer liquids, and the *ye* are the more viscous liquids, including marrow, and even our brain, since "marrow" (being a product of the kidneys) was thought to fill up the spinal cord and also the brain (p.153).

Summary of contemporary metabolism

None of the above terms can be accurately translated into the terms used in contemporary metabolism, since the two systems are entirely different. To help highlight these differences, contemporary metabolism is summarized below.

Our lungs extract oxygen from air and this is transported in our blood.

Our stomach, pancreas, gallbladder, and small intestine (in combination) extract nutrients from our diet, and these are also transported in our blood.

One of the most important nutrients is glucose, which is our body's main fuel (p.374). But this cannot directly provide our body's cells with energy. The glucose, along with oxygen, is transported (via our blood) into every cell, where these two substances are used to create the molecule ATP; and this molecule is then further processed to release energy into the cell, enabling the cell to perform its functions (p.320). Therefore glucose, by itself, is unusable by our body; it requires oxygen to be present in every cell of our body to enable the glucose to be made use of.

Our defence against pathogens is provided by the active components of our immune system, such as lymphocytes (p.202), and the combat largely takes place systemically, in our blood.

Other uses of the term "influence"

Organ influence

This term is also often used in association with an organ, such as in the phrase "lung influence" (lung *chi*) or "liver influence" (liver *chi*), for example. To understand such phrases as the ancient Chinese meant them, it is necessary to realize that Chinese medicine organ physiology was conceived theoretically, rather than discovered through practical observation of organ tissue. The "organs" were considered to be metaphorical centres of activity akin to administrative roles within the Chinese state.

Within this metaphorical system, the term "lung influence" (lung *chi*), for example, could be interpreted to mean literally that: the nature or degree of our lungs' influence amongst the other organs and on our body in general. In other words, how the lungs interact with the other organs and with our body.

An organ's influence was considered akin to a vapour or mist that emanates from that organ. There is no equivalent of this in contemporary physiology, but there is a close analogy. When an organ's function is weak, its interactions with the other organs and the tissue of our body would be affected, such that its usual effects would be proportionally

weaker. Likewise, when an organ's "influence" (the vapour emanating from it) is weak, its effects on the other organs and on our body would *also* be weaker than usual. Therefore, such phrases as "lung influence" (lung *chi*) could be considered analogous to that organ's function—in contemporary physiology.

In today's Chinese medicine, the phrase is also used to describe conditions related to the organs. For example, the term "Lung chi deficiency" (or, lung influence deficiency) is used to describe a common lung condition characterised by weak function. This term could be translated as "poor lung function", which is the translation used in this book.

Meridian influence

The term "influence" (*chi*) is also used in relation to the meridians. As said above, it is often assumed that the influence of each organ flows along its related meridian (along with the various other forms of influence). The intended meaning of this notion would have been along the lines of this. Something akin to a vapour flowed within each organ's related meridian, and this vapour (the organ's influence) contained the "essence" of that organ (much like steam contains the scent of the food being cooked), which might change in character to reflect various conditions in the organ. These conditions might include the organ (the "administrative centre") becoming "full" or "empty" or over-energetic (having an excess of *yang*) or too sluggish (being deficient in *yang*), and so on.

The organ's influence was able to produce effects at any place along the meridian, effects which reflect these various states within the organ. And the nature of an organ's influence could be affected at various "holes" (acupuncture points—or, acupoints) along the meridian, so that if the influence was currently "full" in nature (for example), this "fullness" could be reduced by letting some of the influence out through this "hole" in the meridian, and hence bring the influence level back to normal. This was imagined as being akin to unblocking an irrigation ditch, so that the related administrative centre (the organ) could resume its proper role in organizing the state—so that the fields were irrigated and the products transported to nourish the state (the entire person).[8]

By applying the above analogy (that an organ's influence is analogous to its function), stimulating an organ's influence (its *chi*) at one of these "holes" along that organ's meridian had the effect of normalizing the organ's function.

Parallels with the BSF hypothesis

Interestingly, when considering the term *chi* as it was originally intended (in contrast to the recent trend of equating it to "energy"), the above descriptions then become remarkably reminiscent of the BSF hypothesis (p.359). The hypothesis explains (in relation to contemporary anatomy and physiology) how an organ's function is able to influence any location along its related meridian, and how stimulation of that location is able to rectify malfunctions in the organ. And this influence is produced, not by some physical substance that flows along the meridian, but by the details of the organ's function that are captured in an electrical wave—something as ethereal as the steam rising from food.

Pathogenic influence

The term "influence" (*chi*) was also applied to any other substances that enter our body. For example, after drinking wine, or any other form of alcohol, this clearly had an effect on us, and this was understood in terms of the "wine influence" (wine *chi*) circulating in our body. This, like any other form of influence, was in the form of a vapour that contained some essence of the wine, which circulated in the meridians, interacting with the other influences and, finally, with our organs. And it was the interaction of these various vapours that was thought to produce the effect (heating us up, etc).

Extract from *Su Wen*, Chapter 45

Huang Di: Heat recession, how does this condition come about?

Qi Bo: When wine enters the stomach, then the [collaterals] are full, while the [meridians] are depleted. ... The [influence] has assembled in the [pancreas*] and cannot disperse. The [influence] of the wine and the [influence] of the grain strike at each other. Heat abounds in the centre. Hence, heat is everywhere in the body. The interior is hot and the urine is red. Now, when the [influence] of wine abounds and is fierce and when the [influence] of the kidneys is weak, the *yang* [influence] dominates alone. Hence, it is therefore that the hands and the feet are hot.[9]

The same applied to other pathogens, such as cold. When we were exposed to a cold wind, this was thought to enter us in the form of "cold influence" (cold *chi*), which, again, was a vapour that contained some essence of the coldness. And this vapour circulated in our meridians, interacting with other influences and with the meridians themselves, which is what was thought to account for the results.

Extract from *Su Wen*, Chapter 39

When cold [influence] settles outside the vessels, then the vessels become cold. When the vessels are cold, then they shrink. When they have shrunk, then the vessels are curved and tense. When they are curved and tense, then they pull on the small [collaterals] outside. Hence, sudden pain results. When they are given heat, then the pain stops immediately.[10]

The wind could also be thought of as simply a "harmful" wind which entered us and caused harm. In this case the pathogen was known as "evil influence" (*xie chi*) 邪氣. Again, this was in the form of a vapour that contained some essence of the wind, which then circulated in our meridians, interacting with the other influences to produce its various effects. During treatment, it could be released through certain "holes" in the meridians (i.e. acupoints), but if left to travel around our body, it would attach itself to various structures, causing local signs and symptoms.

Extract from *Su Wen*, Chapter 56

The first emergence of the one hundred diseases must begin in the skin and its hair. When the evil strikes there, then the interstice structures open. When they are open, then the evil enters the [collaterals] and settles there. If it stays there and is not made to leave, it will be transmitted into the [meridians]. If it stays there and is not made to leave, it will be transmitted into the [*yang*

* Usually called the spleen in Chinese medicine; see page 51.

> organs (*fu*)] where it accumulates in the intestines and in the stomach. ... When the evil has entered the [collaterals], then the [collaterals] abound with evil and their colour changes. ... When it stays in the region of sinews and bones, [if] it consists of plenty of cold, then this causes sinew cramp and the bones to have pain.[11]

These other applications of the concept of influence (*chi*) demonstrate beyond any doubt that the *Nei Jing* authors considered all such substances in our body to consist of vapour-like substances that circulate in the meridians. This is entirely different to the interpretation of the term *chi* that has been adopted in today's Chinese medicine (i.e. the notion of it equating to "energy"). This policy was perhaps adopted to render the *Nei Jing* notions more palatable to contemporary minds. But for this interpretation to be valid, it would be necessary to also apply it to all other applications of the term *chi*, so that "wine energy", "cold energy", "defensive energy", "food energy", "harmful wind energy" and so on, would have to also circulate in our meridians. But the notion of all these types of "energy" flowing in the meridians and interacting with each other and with the meridians and our organs, to produce all the various effects, this notion is no more consistent with contemporary anatomy and physiology than *any* of the *Nei Jing* theories are. Therefore, to me, it seems better to keep the two systems distinct—to properly understand the *Nei Jing* but at the same time to appreciate which parts are true and which untrue, and to not attempt to modify the untrue theories to try to mate them with contemporary anatomy and physiology.

What are "collaterals", "tertiary network vessels" and "blood vessels"?

These are referred to throughout the *Nei Jing*, and over the millennia since, there has been uncertainty about what these terms refer to.

The *Nei Jing* authors considered the meridian network to be the sole circulatory system in our body, which circulated both blood and influences simultaneously. The blood circulatory system known today (with arteries, veins and capillaries circulating blood which was pumped by the heart) was then unknown (p.42).

The meridians, or "conduit vessels" (*jing mai)* 經脈, were considered to be the part of the network that tends to run vertically in our body, and these contain the acupoints. However, the *Nei Jing* authors also described vessels branching off from these, in a sideways direction, which they called the collaterals, or "network vessels" (*luo mai*) 絡脈. And branching off from the collaterals, were said to be the "tertiary network vessels" 孫絡.

Blood letting was then a common form of therapy, along with acupuncture. And it is from here that the confusion stems.

From the following *Nei Jing* passages, it seems clear that the "collaterals" and the "tertiary network vessels" refer to the superficial veins that can be seen, often travelling diagonally to the meridians, and sometimes crossing them. These were where blood was let from. It seems that the meridians were thought to lie more deeply beneath our skin, so that the "blood within them" could not be seen, but that these extra vessels travelled nearer to the skin's surface, so that the blood *could* be seen within them.

The term "blood vessel" 血脈 (*xue mai*) was also frequently used in the *Nei Jing*, which adds to the confusion. But with the above points being made clear, I believe the term "blood vessel" was used to simply mean the vessels that blood was usually let from. That is, the collaterals and tertiary network vessels. The following passages also demonstrate this.

The important points to realize are that the *Nei Jing* authors considered

- all these vessels to be separate parts of the same circulatory system and to be thus interconnected;
- that the same blood and influences flowed through every part of the network;
- that the blood circulatory system known today was then unknown; and
- that when blood was let from veins, it was considered to be flowing out of the meridian network as a whole.

The following extracts demonstrate these points.

Extract from *Ling Shu*, Chapter 17

The [meridians] constitute a lining. Those branch courses extending sidewise, they form a network [i.e. the collaterals]. Those diverging from this network, they are the tertiary network vessels. If the tertiary network vessels abound with blood, a punishment is to be swiftly initiated [i.e. to swiftly let blood]. Those vessels where it abounds, they are to be drained. Those that are depleted, they are to be supplemented by means of liquid medication.[12]

This passage portrays the clear notion of letting blood from the veins, which are the "tertiary network vessels". If these vessels *were* considered to be finer versions of meridians, which is the way this term is often interpreted today, then, firstly, it would not be possible to let blood from them—since blood does not really flow in the meridians (pp.42-44). And secondly, in my own clinical experience, I have never encountered any meridians other than the main meridians that bear the acupoints, so that these "vessels" that "extend sidewise" from the main meridians could only be superficial veins.

Extract from *Ling Shu*, Chapter 1

As for the blood vessels, they lie diagonally to the transport [acupoints]. If one looks at them, they appear distinctly clear. If one presses them, they appear distinctly hard.[13]

Here, the term "blood vessels" could only be referring to the veins that "lie diagonally to the" acupoints (i.e. diagonally to the meridians). Firstly, the meridians cannot be seen in a "distinctly clear" fashion, and secondly, their physical structure cannot be physically felt at all. It is true that after a few years of practising, many practitioners (including myself) are often able to "see" the meridians, but this is more of a subtle visual awareness, and is quite different to the experience depicted by the author of the above passage.

Extract from *Su Wen*, Chapter 57

The colours of the *yin* [collaterals] reflect those of the respective [meridians]; the colours of the *yang* [collaterals] change. They have no permanence. The colours are activated in accordance with the four seasons.[14] [see endnote for context]

Zhang Jiebin (in 1957) commented on the above

Ling shu 17 states "The [meridians] are inside; those vessels branching away and running transversely are the [collaterals]. Those parting from the [collaterals] are the tertiary [network vessels]." Hence, if stated in terms of [meridians and collaterals] seen together, then the [meridians] are inside and *yin* and the [collaterals] are outside and *yang*.* If stated only in terms of the [collaterals], one distinguishes again between the [collaterals] and the tertiary network vessels, between those in the interior and those in the exterior. Those located in the depth and in the interior, these are the *yin* [collaterals]. The *yin* [collaterals] are located close to the [meridians]. Hence, they correspond to them in their colours. Hence, their colours are regular.... Those located near the surface and in the exterior, these are the *yang* [collaterals]. The *yang* [collaterals] are visible near the surface; their colour does not correspond to the [meridians]. Hence, it changes irregularly in accordance with the coming and going of the four seasons.[15]

This commentary conveys the notion that the meridians run deeply and are not visible from the skin's surface. And the collaterals (including the tertiary network vessels) also run deeply, branching off from the meridians, but that some collaterals then run near to the surface, and it is those that can be seen through the skin.

Hence the collaterals correspond to the superficial veins that can be seen beneath the skin; and the meridians were thought to run deeply, such that they are not visible from the surface, and that every type of vessel in this network carried the same substances—both blood and influences.

This interpretation of the *Nej Jing* texts also makes sense from another point of view. We can be certain that the *Nei Jing* authors were aware of the veins (since they are clearly visible), so they needed to account for them. The "veins" were separate from the meridians, which lay on different paths and were hidden. And the deduction appears to have been that the meridians are situated deeply, and the "veins" are an extension of them, which rise to the surface and are hence visible. Considering the limited anatomical knowledge available to them, this was a perfectly reasonable deduction.

The following extract is in the context of "obstruction-illness", which is known today as "bi syndrome" (p.211).

Extract from *Ling Shu*, Chapter 81

In the blood vessels, the [constructive and defensive influence] flow without cease.... In the case of cold [influence] settling inside the [meridians and collaterals], the blood will cease to flow. When the blood ceases to flow, it fails to penetrate the [meridians and collaterals]. As soon as it fails to penetrate the [meridians and collaterals], the [constructive and defensive influence] will [accumulate] there. This cannot be reverted. Hence obstruction-illness with swelling results.[16]

The first line in the above quote makes it clear that blood and influences were thought to flow in the same vessels—the meridians and collaterals. The passage goes on: when "cold influence" settles inside the meridians,

* That is, the meridians are situated more deeply beneath the skin than the collaterals are.

the blood ceases to flow. When this ceases to flow, it "fails to penetrate the meridians and collaterals", which causes the constructive and defensive influence to "accumulate there" (i.e. a "blockage" results in the meridian).

In the later *Nan Jing*, this notion seems to have been confirmed when the blood was now referred to as "constructive influence" (see the extract from Section 32 of the *Nan Jing* and the comments that follow—on page 174).

This changeability and vagueness of terms does cause confusion. However, the notion seems clear that the meridians were the only known circulatory system, and that it was therefore thought that both the blood and influences circulated in the meridians, and that, hence, the notion of blood and constructive influence was sometimes considered interchangeable (p.42).

Extract from *Ling Shu*, Chapter 39

Huang Di: I wish to be informed of the unusual [diseases] that are not in the [meridians].

Qi Bo: They are in the blood [collaterals].

Huang Di: When the blood [collaterals] are pierced and the patient falls to the ground, why is that? When the blood shoots out, why is that? When the blood is emitted in small quantities only, and is dark and turbid, why is that? ... How can this be seen?

Qi Bo: When the blood vessels are filled to abundance, when they run hard across and are of red colour, and ascend and descend without a regular location, with the small ones being thin like a needle, and the big ones resembling a sinew, if in such a situation a drainage is performed...[17]

The chapter that the above extract is taken from is called "The blood [collaterals]" and the entire chapter is about the practice of letting blood. This title, taken together with the content, leaves no doubt that the term "collaterals" or "*luo* channels" refers to "veins".

The phrase "when the blood collaterals are pierced" refers to incising the veins to let blood. In the *Nei Jing*, "pierced" means either using a needle to perform acupuncture on the meridians, or using a specialized "needle" (p.281) to let blood from the collaterals (or "veins" in contemporary anatomy).

After the above extract, Chapter 39 of the *Ling Shu* continues to theorize about why various outcomes occur during blood letting—such as the patient falling to the ground or their complexion turning green. This content is analysed on page 287.

How accurate are the *Nei Jing* notions of metabolism and physiology?

The following quotations demonstrate the key notions in Chinese medicine metabolism and physiology. Different chapters from the *Su Wen* and *Ling Shu* were probably written by different authors,[18] and the conflicting notions between the different quotes are notable. The validity of each notion is discussed in the *Conclusions* section below (p.40).

Extract from *Ling Shu*, Chapter 16

For the WAY of the [constructive influence (*ying chi*)], the intake of grain is its most precious function. The grain enter the stomach. The [influences] are forwarded to the lung. They flow into the centre, and they disperse toward the outside. The [pure, es-

sential elements of beverages and food] pass through the [meridians]. It always circulates, without cease.... The influences pour out of the [lung meridian] into the [large intestine meridian]. Upward they pour into the stomach meridian; downward they pass to the instep... [and the text goes on to describe the complete circuit of the 12 meridians, ending back at the lung meridian, then progressing into the lung itself, then back out to the lung meridian again to restart the whole circuit.][19]

The above passage conveys the notion that nutrition is extracted from our food by our stomach, transferred to our lungs, then circulated in the meridians. From the viewpoint of contemporary physiology, it is also implied that this "nutrition" involved glucose but no oxygen, since the lungs' role in extracting oxygen from the air is dealt with separately, and given a different significance (see the extract from *Ling Shu* Chapter 71 on page 35 below).

Extract from *Ling Shu*, Chapter 60

That from which man receives his [influences], that is the grain. Where the grain flows, that is the stomach. The stomach is the sea where water and grain, the [influences] and the blood gather.... The [influences] and the blood leaving the stomach, they follow the [meridians]. These channels constitute the [big passageways] linking the [organs].[20]

This passage appears to convey the notion that the blood is formed in the stomach; that both the blood and the influences flow in the meridians; that these substances flow directly *from* the stomach *to* the meridians, rather than via the lungs; and that (in terms of contemporary metabolism) none of these elements involve the presence of oxygen.

Extract from *Ling Shu*, Chapter 62

The stomach is the sea supplying [all the organs]. Its clear [influences] flow upward into the lung. The [influences] of the lung move along the [lung meridian]. Their movement follows the [inhaling and exhaling of breath].[21]

In contrast to the previous passage, this passage conveys the clear notion that the food influences from the stomach, travel to the lungs *before* progressing to the meridians.

Extract from *Ling Shu*, Chapter 47

The [meridians] serve to transmit blood and [influences]; they nourish the *yin* and *yang* realms. They moisten the sinews and the bones and they make the joints flexible. The [defensive influence (*wei chi*)] serves to warm the partings of the flesh. They fill the skin, fatten the skin structures, and are responsible for their opening and closing.[22]

Again, the notion is conveyed that the blood flows in the meridians. Added to this is the notion that the defensive influence (*wei chi*) warms the flesh, etc. Neither of these notions is literally true, but the *Conclusions* section below (p.40) discusses this and suggests how they might be interpreted.

The passage also states that both the blood and influences provide our body with nourishment, and implies that the blood nourishes the *yin* realms (or aspects) and the influences the *yang* aspects. One possible interpretation of this is that both the blood and influences were thought to nourish every type of tissue, only the *yin* aspect is nourished by the blood,

while the *yang* aspect is nourished by the influences.

Extract from *Su Wen*, Chapter 10

When man lies down the blood returns to the liver. When the liver receives blood one can see. When the feet receive blood, one can walk. When the palms receive blood, they can grasp. When the fingers receive blood, they can hold.[23]

Again, this passage indicates that the blood serves a nourishing role, enabling the muscles to work (so we can walk, grasp, hold) and even enabling our senses to work, such as sight. This, of course, is all literally true, for without a blood supply, no part of our body would survive for long; and when the quality of the blood is reduced, signs and symptoms may develop in all the tissue mentioned in the passage (such as numbness or weak tremors in our limbs, blurred vision, or "floaters"; p.73).

Interestingly, the first sentence in the quote is also literally true. In contemporary physiology, the liver serves as a reservoir for blood, and when at rest, a proportion of the blood returns to the liver (p.90). Over two thousand years ago, this notion could not have been based on practical observation, so must have been deduced by logic alone. To have correctly deduced this (using scanty clues, and those based mainly on metaphor and supposition, much of which was not literally true) was impressive.[24]

Extract from *Su Wen*, Chapter 43

The [constructive influence (*ying chi*)], that is the essence [influence] of water and grain. When it is harmoniously balanced in the five [*yin* organs (*zang*)], and when it is dispersed throughout the six [*yang* organs (*fu*)], then it can enter the vessels.... The [defensive influence (*wei chi*)], that is the violent [influence] of water and grain. This [influence] is fast and unrestrained and cannot enter the vessels. Hence, it moves inside the skin and in the partings of the flesh.[25]

This passage seems to be saying that the constructive influence (*ying chi*) is generated by the harmonious blending of the food influence (*gu chi*) *by* the five *yin* organs (*zang*); and only after being "dispersed throughout the six *yang* organs (*fu*)", is it able to enter the vessels. This is certainly a different notion to that of the influences being passed directly to the vessels by the stomach, or even via the lungs, but now includes the processing of these influences by *all* the organs (*yin* and *yang*) before the influences may emerge at the meridians. This now seems to provide a third alternative version of basic metabolism.

Extract from *Su Wen*, Chapter 21

The [influence] of food enters the stomach. The stomach spreads essence to the liver. Excessive [influence] flows into the sinews.

The [influence] of food enters the stomach. The turbid [part of the influence] turns to the heart. Excessive essence flows into the vessels. The [influence] in the vessels flows through the [meridians]. The [influence] in the [meridians] turns to the lung. The lung invites the one hundred vessels to have an audience with it. [The lungs] transport essence to the skin and the body hair. The hair vessels unite the essence and they move [influence] to the [yang organs]....

Beverages enter the stomach. Overflowing essence [influence] is transported upward to

the [pancreas*]. The [pancreas influence] spreads the essence, which turns upward to the lung. The [lung] frees and regulates the paths of the water, it transports the water downward to the urinary bladder.[26]

This passage also seems to favour the notion that the food influence from the stomach is transferred *directly* to the *yin* organs (*zang*), which then enables each organ to perform its functions (though only selected functions are mentioned). This thereby enables the liver to maintain the sinews; the heart to maintain the "vessels" (i.e. the meridians and collaterals), which are also closely associated with the lungs, so that this also enables the lungs to maintain the skin and body hair. And the pancreas is described as *only* processing the water ("beverages"), rather than the food, and thereby assisting the lungs to maintain the water passages.

Extract from *Ling Shu*, Chapter 56

The stomach is the sea of [all the organs]. All water and grain enter the stomach. All the [organs] are supplied with [influences] by the stomach. Each of the five flavours proceeds to its preferred [*yin* organ (*zang*)]. The sour flavour of the grains at first proceeds to the liver. The bitter flavour of the grains at first proceeds to the heart. The sweet flavour of the grains at first proceeds to the [pancreas]. The acrid flavour of the grains at first proceeds to the lung. The salty flavour of the grains at first proceeds to the kidneys. When the [influence] of the grains and the *jin* and *ye* liquids have assumed their movements, and when the [constructive and defensive influences] widely penetrate the body, then the food is transformed to waste which is transmitted to be released downward one by one.[27]

This passage also suggests that the food influence from the stomach is transferred directly to all the organs.

Interestingly, this theoretical passage also accounts for the factual observation of the associations between the five flavours and their respective *yin* organs (*zang*). It was noticed that each of these flavours appears to benefit a particular *yin* organ (*zang*), and the theory accounts for this by suggesting each of the five flavours proceeds to its "preferred" organ.

Extract from *Ling Shu*, Chapter 71

The five grains enter the stomach. The dregs, the *jin* and *ye* liquids and the [chest influence (*zong chi*)] are separated to enter three channels. The [chest influence] collects in the chest, it leaves the chest through the windpipe. It penetrates the heart vessels, and it is responsible for ex- and inhalation. The [constructive influence (*ying chi*)] seeps out as *jin* and *ye* liquids, and they pour into the vessels. There they are transformed to blood, serving to nourish the four limbs. Internally they pour into the five [*yin* organs (*zang*)] and the six [*yang* organs (*fu*)]... The [defensive influence (*wei chi*)] appears as the wild and fast ones among the aggressive [influence]. At first it moves into the region of the partings of the flesh and the skin in the four limbs. It never rests.[28]

This passage states that the blood is manufactured in the "vessels", which term is used to mean the meridians and collaterals. In other passages, it is stated that the blood is manufactured in the stomach (see *Ling Shu*, Chap-

* Also called the spleen in Chinese medicine; see page 51.

ter 60, p.33). And again it is also notable that the notion of constructive influence (*ying chi*), which was theorized to provide nourishment to the organs and also the entire body, does not (in terms of contemporary metabolism) allow for the presence or involvement of oxygen to release that nourishment.

Extract from *Su Wen*, Chapter 39

The flow in the [meridians] does not stop. It circulates without break. When cold [influence] enters the [meridians], stoppage and retardation result. The contents of the [meridians] are impeded to the degree that they fail to flow. When the cold [influence] settles outside the [meridians], then the blood is diminished; when it settles inside the [meridians], then the [influences] cannot pass through. Hence, there is sudden pain.[29]

This passage again conveys the notion that both blood and influences (*chi*) are circulated in the meridians; and also graphically depicts the notion that the meridians were thought to be tube-like structures, through which the contents flowed, and (here and elsewhere*) it is implied that these tubes could contract due to cold, which could then prevent the contents (both blood and influences) from flowing through them. These notions were further clarified by the following commentary on this passage:

Extract from 1987 article by Li Zhengdong and Wang Xiuzhen

"The blood is diminished" does not mean that the blood is depleted. Rather this is to say that the cold causes the [meridians] to contract with the result that the relative amount of blood and [influences] moved through the [meridian] paths is diminished.[30]

Interestingly, even though this commentary article was written relatively recently (1987), the authors were still keen to faithfully reflect the views of the *Nei Jing* authors (that blood flows in the meridians, along with the influences), even though this is at odds with the facts known today. The authors resisted the temptation to try to modify this *Su Wen* passage to attempt to reconcile it with contemporary anatomy and physiology—a temptation that not all contemporary authors manage to avoid.

Extract from *Ling Shu*, Chapter 18

Man receives his [influence (*chi*)] from the grain. The grain enters the stomach, and from there its [influences] are transmitted to the lung. This way, all [organs] receive [influences]. Their clear parts become the [constructive influence (*ying chi*)]. The turbid parts become the [defensive influence (*wei chi*)]. The [constructive influence] is in the vessels. The [defensive influence] is outside the vessels. They circulate without stop.[31]

Again this passage opts for the stomach–lungs–meridian route, and also appears to imply that the constructive and defensive influences are a product of the influence transferred from the stomach—perhaps each being a subdivision of this. But it is not clear where this division might take place, whether in the stomach, the lungs, somewhere between them, or even somewhere after the lungs. The passage does not contain enough detail to determine this. One possibility is that this detail was not in the mind of the author (that

* The extract from Chapter 39 of the *Su Wen* on page 28 states that the vessels "shrink" when cold.

he simply had not thought about such things) so that future commentators are left to argue amongst themselves on this issue.

Extract from *Nan Jing*, Section 30

Man receives his [influence] from the grains. The grains enter the stomach, from which they are transmitted further to [all the organs]. All the [organs] are supplied with [influences] by the stomach. The clear portion turns into constructive influence [*ying chi*]; the turbid portion turns into protective influence [*wei chi*]. The constructive influence proceeds inside the vessels; the protective influence proceeds outside the vessels.[32]

This passage repeats the detail from Chapter 18 of the *Ling Shu*, but now states that the stomach supplies all the other organs with influences directly, rather than this being done via the lungs. Some commentators saw this as having little significance while others took great exception to the change:

Hua Shou (in 1361), pointed out the differences between this passage and the passage in Chapter 18 of the *Ling Shu*, but stated "That is a minor difference."[33]

Hsü Ta-Chun (in 1727), took great exception with this variance from the *Ling Shu* text. He wrote

> In [the *Ling Shu*], following the sentence "the grains enter the stomach" are the four words "which transmits them to the lung".* Then the text continues: "From there [all the organs] receive their influences". The meaning of this passage is quite clear. Here now, in the *Nan Jing*, those four words are omitted. How could the stomach introduce anything directly into the [other organs]? The consequences of this passage are very significant... That amounts to a distortion of the pattern of the transmission of the influences through the [organs].[34]

And Chang Shih-hsien (in 1510), added significant new details of his own, stating

> The grains enter the stomach, from which their essential influences flow out to be transported upward to the [pancreas]. The influences of the [pancreas] distribute the essential influences further to [all the other organs]. They all are supplied with the influences of the grains in the stomach.[35]

The detail added in the last quotation above, now brings Chinese medicine metabolism much nearer to contemporary metabolism. We now know that the digestion of most of the glucose in our diet is begun by the pancreas, which then enables the small intestine to absorb the glucose into our blood (p.375). Once in our blood stream, the glucose is directly supplied to every structure in our body, including the other organs.

This modification was suggested in 1510, but by 1727, Hsü Ta-Chun was still insisting that every word of the *Nei Jing* (compiled around the 2nd century BC) should be interpreted literally.

However (from the viewpoint of contemporary metabolism), this modified model of Chinese medicine metabolism still has no awareness that oxygen was also needed to be supplied in our blood, alongside the glucose, to enable our cells to extract from the glucose the nutrition they need (what we now know is "energy", in the form of ATP—p.320). And, of course, the Chinese medicine model

* Though this phrase contains six English words, the original Chinese contains only four characters.

also assumes the blood is circulated in the meridians, so that such a model could only ever be considered untrue anyway (see the *Conclusions* section below).

The role of the *san jiao*

A further complication added to Chinese medicine metabolism and physiology is the involvement of the *san jiao* organ (also called the "triple burner"). From its first mention in the *Nei Jing*, around two thousand years ago, this organ has been surrounded with controversy—with commentators and authors arguing about its functions and form (p.204). The organ is said to be divided into three sections, corresponding to the upper, central, and lower parts of our torso. In one interpretation, each of these sections simply serves as a summary of the functions of the organs in that part of our torso, so that the upper section summarizes the functions of the lungs and heart; the central section, the stomach and pancreas; and the lower section, the kidneys, intestines and bladder.[36] This is probably the easiest way to think of the *san jiao* in the following extracts. However, the *san jiao* being such an ill-defined organ, adding its role to Chinese medicine metabolism and physiology only casts a further veil of uncertainty.

Extract from *Ling Shu*, Chapter 56

When the grains have just entered the stomach, their finest essence at first is emitted by the stomach's two [sections of the *san jiao*] to moisten the five [*yin* organs (*zang*)]. They move in two separate streams, along the paths of the [constructive influence (*ying chi*)] and [defensive influence (*wei chi*)].[37]

The wording of the first sentence of this extract is vague and hence confusing, and the following are two examples of commentators' attempts to clarify it.

Ren Gu'an (in the 17th century) wrote

The five types of grain enter the stomach. The waste, the liquids, and the [chest influence (*zong chi*)] move into three separate channels.... The liquids pour into the five [*yin* organs (*zang*)], where they generate the [constructive influence (*ying chi*)] and the [defensive influence (*wei chi*)]. The [chest influence (*zong chi*)], finally, collect in the chest and control [breathing].[38]

The above passage avoids referring to the *san jiao*, so avoids the uncertainties in that way. And note that the passage also favours the notion that the constructive and defensive influences are manufactured in the five *yin* organs (*zang*), similar to the notion expressed in Chapter 43 of the *Su Wen* (see the extract on page 34).

A 1980 Taiwanese edition of the *Ling Shu* clarifies the passage

When water and grain enter the stomach and once they have passed digestion in the central [section of the *san jiao* (i.e. the stomach and pancreas)], they leave the stomach upward via the upper [section of the *san jiao* (i.e. the heart and lungs)], and downward via the lower [section of the *san jiao* (i.e. the kidneys and intestines)], and then pour into the five [*yin* organs (*zang*)] and supply the entire body with nourishment.[39]

The approach of the above commentator seems to be to (in effect) construct a new passage based on ideas gleaned from other *Nei Jing* chapters. However, the resultant interpre-

tation is no less vague than the original *Ling Shu* extract, which may reflect the inherent vagueness of the *san jiao*.

Extract from *Ling Shu*, Chapter 81

The stomach and the intestines receive grain; the upper [section of the *san jiao* (i.e. the heart and lungs)] releases [the influences]. It is to them to supply the partings of the flesh with warmth, and to nourish the bones and the joints, as well as to penetrate the skin structures. The [influences] released from the central [section of the *san jiao* (i.e. the stomach and pancreas)] are like dew.* They ascend and pour into the mountain gorges and valleys and they provide dampness to the tertiary vessels.† When the *jin* and *ye* liquids are balanced, they will transform to red blood. When the blood is balanced, then the tertiary vessels are filled to the extent that they spill over. The spill over flows into the network vessels. As soon as the network vessels are filled, their contents will flow into the [meridians].[40]

This passage states that the blood is manufactured from the body fluids (extracted from our food), and that the manufacture takes place in the "tertiary vessels". In contemporary anatomy, this means the veins, but the *Nei Jing* author would have considered these to be a part of the meridian network (p.29).

Extract from *Ling Shu*, Chapter 18

The [influence] of the central [section of the *san jiao* (i.e. the stomach and pancreas)], they too emerge from the stomach opening; they emerge from behind the upper [section of the *san jiao* (i.e. the heart and lungs)]. The [influence] received there are discharged as dregs, steamed as *jin* and *ye* body liquids, and transformed to fine essence. The latter pours upward into the lung [meridian] where it is transformed to blood which in turn is supplied to the entire body. There is nothing more precious! Hence it may pass only through the [meridians]. It is called [constructive influence (*ying chi*)].[41]

This passage, again, states that the blood is manufactured from body fluids and that the manufacture takes places in the meridians; but this time a very specific location is given: the lung meridian. It is stated that the blood is then supplied to the whole body—through the complete meridian network, presumably beginning at the lung meridian. Thus the passage also repeats the theory that blood circulates in the meridians. And, confusingly, the extract ends by referring to this circulating blood as constructive influence (*ying chi*). It is true that "constructive influence" and blood are both generally theorized to nourish the body simultaneously, and perhaps this was the concept the passage's author had in mind.

Finally, in some contemporary Chinese medicine textbooks, it is even stated that "The transformation of [food influence (*gu chi*)] into blood takes place in the heart," though there is no *Nei Jing* source to support this notion. And the same contemporary author also claims that "The heart is responsible for the circulation of blood just the same as in Western Medicine".[42] This same claim is re-

* " 'Like dew' is to say: they drip like a liquid. In the same manner as rain and dew moisten herbs and trees, they are able to nourish the entire body." (cited by Unschuld, 2016, p.763, footnote 2).

† The "mountain gorges and valleys" are the spaces between our muscles; and the "tertiary vessels" are the small network vessels [i.e. "veins"] which were thought to branch off from the meridians. These are defined in *Su Wen* Chapter 58 (Unschuld, 2011, Vol II, pp.55-56).

peated by other contemporary textbooks,[43] though there is no basis for the claim in either the *Nei Jing* or the *Nan Jing*. Indeed, the very notion contradicts a key tenet of the *Nei Jing*—that the blood flows in the meridians.

To be fair, such statements are doubtlessly made to attempt to reconcile these aspects of Chinese medicine with contemporary anatomy and physiology; though, however well-meant, their only effect is to make it even more difficult to appreciate the Chinese medicine of the *Nei Jing*, which is already muddled enough.

Conclusions

The *Nei Jing* (which comprises the *Su Wen* and the *Ling Shu*) is a collection of ancient scrolls which today still forms the basis of the training of Chinese medicine acupuncturists. Much of the content of the *Nei Jing* is factual. This tends to be the content discovered through practical observation. But other content was arrived at by theorizing, and much of this is either metaphorical in nature and not intended to be interpreted literally, or is simply untrue. To fully appreciate the beauty of Chinese medicine it is necessary to be clear about which elements of the *Nei Jing* are fact based, which are metaphorical, and which are untrue.

It may also be helpful to keep in mind that many of the *Nei Jing* chapters were written by different authors,[18] which may explain why the above extracts often contradict one another, particularly where expressing mere theories, rather than practical observations.

The intake of food and air

The *Nei Jing* authors (or their ancestors) noticed that we are sustained by the intake of food, drink and air, which are all essential to our survival; and that food and drink enter our stomach, while our lungs receive the air. All these observations were true.

It was deduced that our stomach then extracted something from the food and our lungs extracted something from the air,[44] and that these extracted substances (in the form of vapours) were utilized in our body. Again, in essence, this was true—if we overlook the notion of vapours circulating in our body, which contain some essence of the original substance; and instead assume that this vague notion of vapours being utilized in our body is analogous to the transport systems known today.

So far, the picture is fairly clear. But from this point onwards in the metabolism, comprehending the intended meaning becomes more difficult, because there are two versions to consider—the original *Nei Jing* version, and the version adopted by today's Chinese medicine.

Today's version

In today's Chinese medicine, it is usually stated that these two extracted substances, food influence (*gu chi*) and clear influence (*qing chi*), are combined in our lungs to produce a third substance, chest influence (*zong chi*).

This statement is doubtless informed by today's knowledge. In contemporary physiology, our stomach (and pancreas and small intestine working together) extract glucose from our food; our lungs extract oxygen from the air we breathe; and these are then com-

bined to produce ATP, which releases the energy that drives every cell in our body (p.320). However the combining takes place in our cells, remotely, rather than in our lungs, as stated by today's Chinese medicine. This is the first incorrect fact.

But further, in none of the various versions of Chinese medicine metabolism, is the equivalent of oxygen (clear influence) transported in our meridians at all (and the meridians were the only known circulatory system, so there was no other way to circulate it). And chest influence (*zong chi*), which is the only Chinese medicine substance that *could* be considered analogous to ATP (albeit generated in the lungs—according to today's Chinese medicine), is not present throughout the meridian network—and hence throughout our body.

The *Nei Jing* authors simply did not realize that "oxygen" was required by every part of our body, and was needed to release the nutritive value of "glucose" (or food influence); and their various models of metabolism reflect this mistake.

The Nei Jing version

In all the extracts from page 32 onwards, and in any other similar *Nei Jing* passages, or indeed in the original full chapters that the extracts are taken from, chest influence (*zong chi*) is not described as resulting from the combining of air and food influence. It is simply stated that the inhaled air is stored in the lungs and heart; that (in *some* versions) food influence is "steamed" from the stomach up into the lungs*; and that the combined functioning of the heart and lungs relies on chest influence. That is, the heart and lungs work closely together (p.173), and chest influence represents the functioning of these two organs in the same way that any other organ's influence is said to represent the functioning of those organs (p.26). Nowhere is there the specific notion that these two substances are combined, which thereby *creates* chest influence. This is a notion adopted by today's Chinese medicine, informed by today's knowledge of metabolism.[45]

Putting aside today's knowledge, there was no reason for the *Nei Jing* authors to think that the products of the stomach and lungs needed to be combined. We only eat about three times a day, but breathe continuously, so it was not obvious that the products of eating and breathing needed to be combined in our body. And considering the other *Nei Jing* notions of metabolism, there was no reason for them to imagine that clear influence (or "oxygen") needed to be present in any part of our body except the lungs. They had no knowledge of chemistry, or of how cells work, what energy drives them, nor even of the *existence* of cells—as we know them today. Their theories of metabolism and physiology tended to be metaphorical—such as the notion that our stomach "cooked" food to produce the vapours (such as food influence) which were akin to the steam that rose from food as it was cooked in real life. And such theories were produced by logic alone (rather than being based on practical observation of our internal anatomy), and there was no logical reason for them to deduce that food influence *(gu chi*)

* Their notion of organ physiology was metaphorical; it assumed the stomach "cooked" the food to produce such "steam" (i.e. the vapours that are food influence); see endnote 44 in this chapter.

and clear influence (*qing chi*) needed to be combined.

It would be wrong to project contemporary knowledge onto the *Nei Jing* texts. It is possible that the *Nei Jing* authors simply regarded breathing as something the lungs do but that the air played no part in the metabolic processes in our body. Likewise, in today's Chinese medicine, the notion that the lungs expel "waste influence" is projected onto the *Nei Jing* texts, simply because we now know that this happens (in the expelling of carbon dioxide). But there is no indication in the texts that the *Nei Jing* authors believed this, nor that it had ever occurred to them (p.114). This notion is one of the many contemporary ideas that have been wrongly attributed to the *Nei Jing* texts by today's Chinese medicine textbooks.[46] This issue highlights a further pitfall in the interpretation of ancient medical texts—the tendency to project today's knowledge onto them.

The manufacture and transport of blood

It was imagined that our blood was made by combining two types of liquid that our stomach separated from our food, was manufactured either within the meridian network or in the stomach itself (depending on which text you choose to follow) and was circulated in the meridians. Every aspect of these descriptions is either untrue or largely untrue.

The *Nei Jing* notions about blood manufacture were largely untrue; there was an element of truth in that our diet does supply the raw materials that go to make up the nutritional part of blood, but their notion of how blood is produced is simply untrue (it is not manufactured in the meridians, nor in our stomach).

The *Nei Jing* authors also had no notion of a *separate* circulatory system consisting of the arteries, veins and capillaries which circulates the blood (as is known today). Instead, the blood was thought to flow in the meridians, along with the influences (*chi*), which is simply untrue.

It is true that they were aware of veins (which they called "collaterals" and "tertiary network vessels"), but they considered these to be a part of the meridian network, in that they branched off from the main meridians and rose to the surface, which explained why they were visible under our skin (p.29). And they thought that the same substances flowed in these as flowed in the meridians, therefore their knowledge of the "veins" could not be equated to the blood circulatory system as we know it.

They regarded blood as a red liquid that spilled from the body when we were wounded, or could be deliberately released by incising the "veins". They were familiar with palpating the pulse at many locations on our body, but these were always at locations where a meridian flowed; and the pulse was not associated with a pumping action in the heart. It was simply regarded as a "movement in the meridian" that could be monitored to indicate various states about the function of the organ associated with that particular meridian. And Unschuld also makes it clear that the *Nei Jing* texts contain no indication that either the heart or the lungs were thought to perform any kind of pump-like or bellow-like function.[47]

To put this in perspective, it should be noted that in the West, it was not until 1628

that William Harvey discovered the function of the heart and the existence of the blood circulatory system.[48]

The existence and pathways of the meridians were discovered through practical observation (as they can be today, by sensitive people being able to feel their presence), therefore the Chinese medicine notion of the existence and pathways of the meridians is true. But no other circulatory system was known to them (not even after dissecting a body), and it was wrongly assumed that *all* circulation therefore took place through the meridians.

The notion of blood

In contemporary physiology, blood is not simply a nutritive substance. It consists of plasma (about 55%) and cells (about 45%), which together contain

- water (about 90% of plasma is water);
- plasma proteins (such as antibodies, clotting factors);
- minerals;
- nutrients, including glucose, vitamins, amino acids, fatty acids (mainly extracted from digested foods);
- hormones (for cellular communication);
- enzymes;
- gasses such as oxygen, carbon dioxide;
- red blood cells, or *erythrocytes* (which transport oxygen); and
- white blood cells, or *leukocytes* (which perform immune functions, such as killing microbes or removing waste materials, such as dead cells).[49]

Therefore our blood is made up of many different elements, which are manufactured in separate parts of our body. The nutrients from our digestion are extracted by the combination of our stomach, pancreas, gallbladder and small intestine, the last transferring them into the blood stream (p.53). The hormonal content is secreted from cells everywhere in our body*. The oxygen is transferred into the blood by our lungs (p.113), and the carbon dioxide, as a waste material of respiration, by every cell in our body. The red and white blood cells are manufactured in our bone marrow.[50]

If considering only the nutritional aspect of blood, then the *Nei Jing* notion was partly correct. The blood *does* provide nourishment, only it is not restricted to *some* aspects of it (such as only the *yin* aspect) but provides all nourishment. The *Nei Jing* mistakenly thought the *yang* aspect of nourishment was provided separately (by the "constructive influence"†), but that both these aspects flowed together in the meridians. The fact that both these aspects flowed together (the *yin* and *yang* aspects of nourishment) was true; they do. But they do not flow in the meridians; they are, in fact, both part of the same substance, the blood, which flows in the blood circulatory system, whose existence the *Nei Jing* was unaware of.

The blood is also the transport medium for our immunity, in the white blood cells and antibodies. The *Nei Jing* imagined the blood to have no defensive function but in-

* Page 81 provides an example of how hormones function.

† —Though the picture was complicated by the *Nan Jing*, which started referring to blood as "constructive influence", rather than this being the *yang* aspect of food influence, as stated in the *Nei Jing*; see p.174.

stead attributed this to a completely imaginary system that was transported in the meridians (the defensive influence, covered below).

The red blood cells transport oxygen. The *Nei Jing* did imagine a purpose for oxygen, but had no notion that it was needed by every cell in our body, nor that it was transported in our blood.

The hormonal content of blood serves as one of the major communication mediums in our body (p.81). The *Nei Jing* had no notion that the blood served any such purpose; and, indeed, the notion of bodily communication (in the sense of hormones and the nervous system) does not appear to have been considered by the *Nei Jing* authors. It could be argued that the various "influences" constitute communication between our organs and bodily tissues, but I do not believe the *Nei Jing* authors imagined it in this way. This is a modern conception, born from the knowledge of our nervous and hormonal systems.

The substance the *Nei Jing* authors had in mind when they described blood was certainly the same substance that we call "blood" today.[51] But because of their various misconceptions about metabolism, physiology, immunity and anatomy, they simply got the above mentioned details wrong. However, the *Nei Jing* statements about the nutritional aspects of blood can, in spirit, be taken literally, as long as the above caveats are born in mind.

Blood may also be called "constructive influence"

To add further confusion to *Nei Jing* metabolism, in the *Nan Jing* the idea was introduced that blood and constructive influence could sometimes be regarded as the same thing. This idea is discussed on page 174.

The meridian network and its purpose

It was thought that the meridians existed in every part of our body and formed a circuit which extended to every organ. This is factual.

It was also thought that the meridian circuit *began* at the lung meridian and progressed to every other meridian before returning to the lung meridian to begin again. The location the circuit "starts" at is an arbitrary notion, but it seems this location may have been suggested by other theories within Chinese medicine metabolism. In *some* versions of this, it was considered that the vapour-like food influence *rose* from the stomach (just as steam does from a cooking pot), to the lungs, and the lungs then circulated this vapour-like substance (which had a *yin* and *yang* part—the constructive and defensive influence) to the other organs and around our body via the meridian network. Therefore it would have seemed natural that this process began at the lung meridian.

The notion that this nourishing, vapour-like substance flows through the meridians is untrue. Instead, we now know that nutrients are transported via our blood, which circulates glucose (our body's main fuel) to every distal cell, where the glucose is combined with oxygen to produce the molecule ATP which is then able to release the energy that enables each cell to function (p.374).

However, if we considered constructive influence to be analogous to glucose, then the meridian network's supposed circulation of constructive influence *could* be considered

analogous to the circulation of glucose *and* oxygen (together) by our system of arteries. Is this too generous, or does the analogy work? Each (the meridians or arteries) is merely a transport system, and what happens at either end is generally the same in both cases. Our organs process our food and place the necessary ingredients into the transport system, and at the other end the local tissue is nourished. If a blockage occurs in a branch of the system, the tissue reached by that branch is no longer properly nourished. These facts are the same in both cases—with the blood circulatory system, and with the meridian system's supposed circulation of constructive influence. Therefore, as an analogy, this Chinese medicine notion works. It should be appreciated, though, that the notion is not literally true.

If we were to also consider clear influence (*qing chi*) to be analogous to oxygen, it could be said that the above mistakes in Chinese medicine metabolism were perhaps the inevitable result of the *Nei Jing* authors not realizing that clear influence was necessary everywhere in our body; and also not realizing that the blood circulatory system existed.

The notion of defence against pathogens

The *Nei Jing* authors deduced that something along the lines of an "immune system" was present in our body, which was impressive. But again, because they were working from pure logic (having made no practical observations of the internal workings of our body that could reveal how an "immune system" might work), they got the details wrong.

They imagined that another vapour-like substance, which they called "defensive influence" (*wei chi*), flowed in the spaces between our skin and muscles and thus provided the warmth to our skin and muscles, which warmth is what protects us from attack by external pathogens.

Today, we think of our immune system as consisting of various tiny components that aggressively attack and kill any foreign bodies that enter us (p.202). Because this concept is so well known today, when we interpret the *Nei Jing* notion of defensive influence it is tempting to imagine that it produces its effect by "doing battle with" or "combating" the evil influence (*xie chi*), or "harmful wind", which enters us through our skin. But no such notion was in the minds of the *Nei Jing* authors. Instead, it is clear that the general thinking was that defensive influence (*wei chi*) provided the warmth to our skin and muscles and that it was this warmth that protected us from attack by external pathogens. The following *Su Wen* extract even clearly states that the defensive influence "does not merge with" the pathogens.

Extract from *Su Wen*, Chapter 43

Huang Di: The [constructive and defensive influence], do they also let a person have a block? [i.e. an obstruction]

Qi Bo: ...The [defensive influence], that is the violent [influence] of water and grain. This [influence] is fast and unrestrained and cannot enter the vessels. Hence, it moves inside the skin and in the partings of the flesh.... The [defensive influence] does not merge with the [influence] of wind, cold, and dampness. Hence, it does not cause a block.[52]

Hence, when a person was healthy, it was the warmth of their skin and muscles that

protected them, but when a person was "deficient", so that their skin and muscles were not properly warmed, this enables pathogens (such as harmful wind) to penetrate their skin.

Extract from *Ling Shu*, Chapter 66
When wind, rain, cold and heat cannot avail themselves of a depletion, their [harmful influences] alone are unable to harm man. When someone suddenly encounters a swift wind and heavy rain and does not fall ill, the reason is that he did not have a depletion.[53]

Hence, with a "deficient" person, the pathogen enters their skin. At this stage, the pathogen could be released from our body through various "holes" in the meridians (acupoints), or by inducing sweating, which also enabled (or compelled) the pathogens to escape.

Extract from *Su Wen*, Chapter 19
The wind is the chief cause of the one hundred diseases. Now, when wind and cold settle in a person, they let this person's entire finest body hair stand up straight. The skin closes and develops heat. At this time, the wind and the cold can be effused through induced sweating. In some cases block, numbness, swelling, and pain result. At this time, it can be removed through hot water and poultices, as well as through fire cauterization and piercing. If no cure is achieved, the disease enters the lung and lodges there. It is now called "lung block". It develops cough and rising [influences].[54]

Extract from *Su Wen*, Chapter 60
Huang Di asked: I have heard, the wind is the origin of the one hundred diseases. To treat it with needles, how to proceed?

Qi Bo responded: When wind enters the body from the outside, it lets a person shake from cold. Sweat leaves the body and the head aches. The body feels heavy and has an aversion to cold. Treat this at [Du-16 (*Fengfu*)].[55]

It was theorized that if this was not done, the pathogen lodges there and then gradually makes its way through the meridian network until it reaches our internal organs, first the *yang* organs (*fu*), then the *yin* organs (*zang*). Once it reaches a *yin* organ, a serious disease results, which is difficult to treat.

Extract from *Ling Shu*, Chapter 66
When a [harmful influence] strikes a person, in the beginning it is in the skin. When the skin is relaxed, then the skin structures are open. When they are open, the [harmful influences] enter via the body hair. Once they have entered, they proceed into the depth. When they are in the depth, the body hair will rise. When the body hair has risen, then that person shivers. Hence the skin aches. When the [harmful influences] remain there for some time and are not removed, then they are transmitted further and they will settle in the [meridians]. While they are in the [meridians] the muscles and the flesh are in pain... [This passage then goes on to describe the progress of the pathogen through the various sections of our body, with the symptoms produced at each].[56]

Every detail of this whole scenario is simply untrue; our protection from attack by external pathogens is performed by various elements of our immune system, where the "combat" takes place either in our lungs (p.113) or in our blood, which certainly does

not flow in our meridians; and no part of our immune system is responsible for warming our skin. The anatomy of the meridians has, by now, been fairly well investigated (as described in Chapter 16), and nothing resembling the function or nature of "defensive influence" flows in our meridians.

However, the notion of defensive influence (*wei chi*) *could* be thought of as being analogous to the active components of our immune system, the lymphocytes and antibodies (p.202), since these perform the same function that defensive influence was thought to. But the notable differences are that in our immune system, a genuine combat *does* take place, but this happens in our lungs (when defending against airborne pathogens—p.113), whereas in *Nei Jing* physiology, no combat takes place but instead the warmth of our skin and muscles was thought to protect us from invasion by pathogens. And in contemporary physiology, once pathogens enter us, the combat then takes place in our blood generally, whereas in the *Nei Jing*, there was no concept of any such "immune" function taking place *within* our body.

The *Nei Jing* authors were aware that pathogens could either enter us from outside or be created within us.

Extract from *Ling Shu*, Chapter 28

As for the very first origin of all diseases, they all originate from wind, rain, cold and summer heat, from *yin* and *yang* [influences], joy and anger, from beverages and food and from living conditions, from being severely scared and from sudden fear.[57]

Hence, if illness was caused by mental or emotional factors (which could be considered internal pathogens), then it was thought that there was no protection against such pathogens, so they entered the *yin* organs (*zang*) directly and caused serious illness which was difficult to treat.

Interestingly, the same situation exists in contemporary physiology—as described in the sections of this book's organ chapters that deal with mental functions. Our thoughts and emotions directly induce organ malfunction; and once this becomes habitual, it is difficult to treat. In contemporary physiology, such "pathogens" (thoughts and emotions) are invisible to our immune system, and the induced organ malfunctions cannot usually be satisfactorily treated—such as IBS (p.57), all stress-related signs and symptoms (p.103), and so on.

The *Nei Jing* position on "defence" against such mental and emotional "pathogens" was to avoid excessive anger, etc., and you would not then become ill.

Extract from *Ling Shu*, Chapter 66

When joy and rage are immoderate, then that will harm the [*yin* organs (*zang*)]. When the [*yin* organs] are harmed, then a disease emerges in the *yin* realm.... Grief and pondering harm the heart. Repeated cold harms the lung. Rage harms the liver. To be drunk when entering the women's chamber and to sweat during sexual intercourse and then to be met by wind, will harm the [pancreas]. When someone overexerts himself, and then enters the chamber [i.e. has sex] and sweats, that will harm the kidneys. This way ... diseases are generated.[58]

Extract from *Su Wen*, Chapter 3

The fact is, the wind is the origin of the one hundred diseases. In case a person is clear and calm, the flesh and the interstice struc-

> tures are firmly closed up and resist. Even though there is a strong wind which is a violent poison, it will be unable to harm that person. This is so because one follows the sequence of the seasons.[59]

However, once such illnesses have developed, it should be noted that Chinese acupuncture is usually adept at remedying the signs and symptoms, and also at helping the person to adjust the harmful mental and emotional habits—as described in the "mental functions" sections of the organ chapters.

Does *any* vapour-like substance flow in the meridians?

If there is no defensive influence (*wei chi*), nor constructive influence (*ying chi*), nor chest influence (*zong chi*) flowing in the meridians, what *does* flow within them?

Another way the term "influence" was used in relation to the meridians was to describe the effect an organ had on its related meridian, or the effect the acupoints had on the related organ. With each organ, it was thought that the influence (*chi*) of the organ flowed in its related meridian (which could be visualized as a vapour that contained some essence of the organ and therefore reflected different states in the organ); and that it was the effects of this influence that caused any organ malfunctions to be reflected at locations along its related meridian. And also, that it was the manipulation of this influence via the acupoints that could correct those same organ malfunctions. For example, on the heart meridian, "heart influence" (heart *chi*) was thought to flow along the meridian and produce the above effects. Is this true?

Perhaps surprisingly, I would say "As nears as makes no difference—yes." From Bong-Han Kim's studies and the research that has followed (Chapter 16), it is clear (perhaps *un*surprisingly) that nothing resembling the steam from food, or a vapour, has been found flowing through the meridians—or around them (as "defensive influence" is said to do). However, this book's BSF hypothesis describes a similar system—where the "influence" of our organs is transferred to the meridians and acupoints, and where that same "influence" can be affected at the acupoints to correct malfunctions in that organ (p.359). According to the hypothesis, this influence is embodied in an electrical wave that travels on the tiny electrical current in the connective tissue of the meridian sheaths; and such information could certainly be regarded as being as ethereal as vapour.

An organ's influence (its meridian *chi*) could certainly be regarded as being strongly analogous to the information in this electrical wave. When the *Nei Jing* authors imagined this substance as being the explanation for all the effects they discovered through their practical observation of acupuncture and healing—it is true they imagined the substance as being akin to a vapour, but the knowledge of electricity and of the microscopic anatomy of our body did not yet exit, so they had no choice but to describe it using the terminology known to them.

Putting aside this terminology issue, it seems to me that these two systems are one and the same. Therefore, using logic alone, it seems that the *Nei Jing* authors managed to describe the mechanism that enables acupuncture to work, whereas contemporary science (in this *one* area of the subject) has only recently managed to duplicate what the ancient Chinese discovered over two thousand

years ago (that is, if the BSF hypothesis is ever experimentally validated).

The notion of "original influence"

There are clear correlations between the ancient Chinese notion of original influence (*yuan chi*) and certain hormonal activity in our body—as described in the chapters on the kidneys and the lymphatic system (p.166 and 207). This means that, in effect, the ancient Chinese correctly worked out that a hormonal-like substance, which originated in our three kidney-related structures, circulated our body and controlled all its vital functions. To have worked this out over two thousand years ago was an impressive achievement (pp.166-169 and p.207).

The role of the kidneys, bladder and intestines

In the *Nei Jing* theories, the small intestine plays no part in the extraction of nutrients from our food. This was a further mistake; the small intestine plays a vital role in absorbing the digested food into our blood (p.194). And urine was theorized to originate from our digested food; it was thought to be extracted by our large intestine, which then passed it to the bladder (p.169). All these details are also untrue; urine is produced by our kidneys, during its filtering of our blood, and our kidneys then pass the urine to the bladder. Whereas the *Nei Jing* contained no notion that the blood was filtered at all, nor that it served as a *transport* for digested nutrients and other vital substances (p.170).

Hence (considering the entire content of this *Conclusions* section) many details in the *Nei Jing* theories on metabolism and physiology are simply untrue. Their study, though, does provide a fascinating insight into the minds of physicians over two thousand years ago—provided that a clear distinction is made between these theoretical elements and the fact-based content of the *Nei Jing*.

Does it matter that Chinese medicine uses metaphor?

The theoretical side of Chinese medicine is largely metaphorical, and other aspects of the theories contain substantial factual errors, such as those highlighted in this chapter. However, the most significant elements of this healing system were discovered through practical observation, and those elements are fact based—and remain impressively accurate in clinic today, over two thousand years later. The key facts are the signs and symptoms related to each organ's pathology, the locations of the meridians and acupoints, and the causes of disease, including mental and emotional factors.

To put this in perspective, over the last few decades there has been much scientific investigation of the meridians and also speculation by academics on how acupuncture may work. These academics had access to an incredible body of scientific knowledge, yet their hypotheses have proved to be demonstrably untenable (pp.360-362 and 389-395). And when considering that the ancient Chinese had no access to any of this scientific knowledge, their achievements were astonishing—specially since, if the BSF hypothesis proves to be anywhere near the truth, the ancient Chinese came nearer to understanding how acupuncture works than most contemporary academics were able to (p.48).

Even though much of the theoretical side of Chinese medicine is metaphorical, or relies

on facts that are largely untrue, the overall system (perhaps *because* it is metaphorical) still works beautifully. The untrue facts may be viewed as largely academic, since they do not affect treatment outcome. And the metaphorical aspects of the system can often help to produce a diagnosis and select the acupoints to use. Such a diagnosis is also usually metaphorical (such as "Stomach heat", "Excess liver yang", "Deficient kidney yin" and so on), yet the treatment still works.

This book helps students to identify whether a *Nei Jing* passage is either fact based, metaphorical, or simply untrue. But beyond this, the book also describes the key aspects of Chinese acupuncture (such as the organ functions) in relation to contemporary physiology. This enables Chinese medicine to be explained to patients using terms they can understand—while, within the practitioner's mind, any aspect of the *Nei Jing* may still be used to assist in forming a diagnosis and planning a treatment.

(See also Chapter 13, which analyses numerous passages from the *Nei Jing* to demonstrate how some of the untrue theories may have been formed.)

Chapter 3. Pancreas and stomach

Attribution of Chinese medicine organs

As demonstrated in the previous chapter, many of the notions in *Nei Jing* metabolism and physiology are simply untrue, including some aspects of organ function (such as the stomach "steaming" vapour up to the lungs; the large intestine producing urine and passing this to the bladder; and so on). Due to these issues, this resulted in there being only a loose relationship between the theoretical *Nei Jing* organ functions and the actual anatomical organs (which I explain in more detail below). Unfortunately, this loose relationship led to one of the key *Nei Jing* organs being attributed to the wrong anatomical organ. And this misattribution continues to be used today in Chinese medicine, which causes confusion.

The main digestive organ in Chinese medicine is called *pi* 脾. In terms of our anatomical organs, this was associated with the spleen. However, when comparing this organ's main functions with those of the organs described in contemporary physiology, it is clear that the organ *should* have been associated with the pancreas.

The main functions of the Chinese organ *pi* are that it plays a key role in digestion and the production of energy; and is also responsible for our appetite (p.54). Whereas the pancreas produces juices and enzymes that digest carbohydrates, proteins and fats[1]; secretes the hormones *insulin* and *glucagon* to control the uptake of glucose, which is our body's main fuel[2]; and also secretes the hormone *pancreatic polypeptide*, which is thought to produce our appetite.[3] Hence this organ's main functions are also digestive and the production of energy and our appetite. It seems obvious that these two descriptions are referring to the same organ and that the Chinese medicine organ *pi* should therefore have been attributed to pancreas.

The spleen (in contemporary physiology) is a part of the lymphatic system (it may be regarded as a large lymph node) and its main functions are therefore related to immunity[4]; but it also helps to maintain an appropriate amount of fluid in the tissues and purifies the body fluids, destroying debris such as dead cells[5]; so it is difficult to see why the Chinese medicine organ *pi*, the key digestive organ, is still equated to the spleen.[6]

Section 42 of the *Nan Jing* states, "The spleen weighs…. Its flat width is three inches. Its length is five inches,"[7] whereas the spleen (in contemporary physiology) is a rectangular structure with a thickness of about one inch, length of about 4.7 inches and width of about 2.7 inches.[8] Clearly this *Nan Jing* description is describing the spleen (of contemporary physiology), rather than the pancreas.

How was this mistake made?

Such dimensions could only have been obtained by dissecting a body, which raises the question: how was each anatomical organ associated with the theoretical organ functions then known?

Even though the knowledge of basic organ anatomy was known to *some Nei Jing* authors, [9] this knowledge could not have amounted to much more than an awareness of the organ masses in our torso. This would not have enabled the functions of those organ masses to be correctly worked out, since this would have required a knowledge of the chemistry and microscopic anatomy of the organ tissue, which knowledge simply did not then exist. So, even though there was basic knowledge of our internal anatomy, this would have provided little assistance in working out the organ functions.

To some degree, it might be supposed that the physical "plumbing" between the organs may have provided a clue to each organ's main function, but due to the misguided notions of *Nei Jing* physiology, the presence or absence of physical links or "tubes" between the organs was not necessarily a guide or a limitation.

For example, it was theorized that nutrients passed around our body in the form of vapour. All *Nei Jing* authors shared this belief. They imagined that the essence of our food, rose from the food, much like steam from a cooking pot, and this steam, or vapour, then circulated in the meridians to every location in our body (p.23). Hence, it was imagined that the stomach extracted this vapour by "cooking" the food, so that the vapour rose from it, much as happens in real life. And some *Nei Jing* authors theorized that this "steam" rose from the stomach and passed to the lungs, which then circulated it in the meridians (p.41). The fact that there is no physical link between the stomach and lungs was not a limitation, since their model of physiology did not require a physical link. Instead, since they believed that nutrients travelled in our body in the form of vapour, there was no reason to think that this vapour was not capable of steaming between one organ and another, so that a physical link between such organs would not be found during dissection. And the same is true of their misguided theory that the large intestine produces urine, then passes this to the bladder (p.49). There is no anatomical link between the intestines and bladder, but this (if known about) would not necessarily have been a limitation, since they could have imaged the exchange also taking place in the form of vapour. This is what I mean by there being only a loose relationship between the physical organ masses and the theoretical *Nei Jing* organ functions.

If the "plumbing" between the organs was not a guiding factor, and it was not possible to work out an organ's function from its tissue, how did they manage to attribute the other organs correctly?

Generally, the discomfort produced when an organ is stressed may have been the guid-

ing factor. With the liver, kidneys, stomach, heart, lungs or intestines, the discomfort would have helped identify which anatomical organ produced the symptoms. With the Chinese medicine organ *pi*, any such discomfort would have been in the region of the stomach organ, and perhaps mistaken for being produced by the stomach. So to find which anatomical organ to associate with the Chinese organ *pi*, its theoretical function was perhaps the only clue.

The requirement was to locate *an* organ near to the stomach, since this was suggested by the organ *pi's* digestive function. The spleen is a relatively large organ mass adjacent to the top part of the stomach, and when viewed from the front during dissection is much more visible than the pancreas (which would be hidden from view, behind the stomach),[10] which may explain why the spleen was selected rather than the pancreas. The fact that there is no physical link between the spleen and stomach would not have been a limitation, since the *Nei Jing* notions of physiology did not require there to be a physical link. Any substances that passed between the organs could have flowed as vapours (as they were thought to do between the stomach and lungs). Understandably, due to their mistaken notions of metabolism and physiology, they had no idea that the spleen, even though it was a large organ adjacent to the stomach, played no role in digestion.

Unfortunately, due to this original misattribution, the term "spleen" is now used in Chinese medicine to refer to this organ, *pi* (the pancreas), and also used in clinic, in discussions with patients. But in order to clear up this confusion and enable contemporary minds to understand discussions of Chinese medicine, I believe it is important to correct this misattribution, and throughout this book I therefore refer to this organ as the pancreas. But when reading other Chinese medicine texts, you should be aware that this same organ would usually be referred to as the spleen.

The functions of the pancreas

As stated above, in contemporary physiology, the main functions of the pancreas are that it

- produces pancreatic juice, which contains enzymes that digest carbohydrates, proteins and fats[1] (these enable the small intestine to absorb the nutrients into the blood stream—p.194);
- secretes the hormones *insulin* and *glucagon* to control the uptake of glucose,[3] which is our body's main fuel[2]; and
- secrets the hormone *pancreatic polypeptide*, which is thought to produce our appetite.[3]

The Chinese medicine approach

In contemporary physiology, the notions of our organ functions were formed by dissecting the body, examining our organs and systems at the microscopic level, and attempting to work *backwards* from those observations. But in ancient China they used a different approach. At that time, our contemporary knowledge of the chemistry and microscopic anatomy of the body did not yet exist, so could play no part in their reasoning. Instead they relied purely on practical observation. They observed the signs and symptoms that were produced when an organ was stressed, and which cleared once that organ was treated. And this was all they needed to know.

The concept of organ functions, as we think of them today, did not then exist. Later though, Chinese intellectuals did work out many theories to attempt to explain *how* the various symptoms were produced, which theories are described throughout the *Nei Jing*. However, many of these are simply untrue, such as most of their notions of metabolism (pp.40-49); and also see my analysis of the five phase theory and its misapplication to attempt to explain signs and symptoms (pp.255-269).

Today's Chinese medicine avoids this issue by using an approach reminiscent of that used by the ancestors of the *Nei Jing* authors. Rather than describing organ functions in terms of *how* the signs and symptoms (and normal functions) are produced, general phrases are instead used to summarize an organ's main functions and also the *effects* of those functions.

The difference between functions and effects

For example, in the following list the pancreas is described as "providing strength and substance to our muscles". This phrase does not describe a function but an indirect effect. The effect is fact based, but this could not be described as a literal function of the pancreas, since the pancreas (in contemporary physiology) only enables the completion of digestion and then regulates the uptake of glucose. It is the presence, or absence, of the digested resources that then produces the *effect*, which is to provide our muscles with strength and substance. Hence this is an effect rather than a function.

These descriptions have the advantage of being true—since they avoid repeating *Nei Jing* theories and focus on practical observations.

It is important to make the distinction between such functions and effects, so as to facilitate communication with healthcare practitioners outside of Chinese medicine—and also with your own patients. If an effect such as the pancreas *providing strength and substance to our muscles* were referred to as a pancreas function, this notion could only be rejected by anyone familiar with contemporary physiology, since there is no direct functional link between the pancreas and our muscles. Whereas if these qualities in our muscles were described as an indirect *effect* of the pancreas function, this would enable contemporary physiology to at least consider the phenomenon.

Hence, in today's Chinese medicine, the functions and effects of the pancreas are described as follows.

The Chinese medicine functions and effects

The pancreas

1. completes digestion, enabling the digested resources to be transported around our body;
2. provides strength and substance to our muscles;
3. produces our sense of taste and the colour in our lips;
4. prevents haemorrhage;
5. counters the effect of gravity on our organs; and
6. has mental and emotional functions.

Below I explain each of these functions and effects in turn and relate them to contemporary physiology.

1. Completes digestion, enabling the digested resources to be transported around our body

The first part of this description ("completes digestion") is a direct function rather than an effect.

The *Nei Jing* authors noticed that when the pancreas function was poor, the patient often experienced some or all of the following signs and symptoms:

- general weakness,[11]
- emaciation and malnutrition,[12]
- poor appetite,[13]
- abdominal bloating and discomfort[14] with excess gas,[15] and
- loose stools.[16,17]

From this, it was deduced that the pancreas *completes digestion*—since, when the pancreas function is poor, the resources from the food we eat are unavailable, rendering us weak and malnourished. And it was also deduced that the pancreas *enables the digested resources to be transported around our body*—since, when its function is poor, no digested resources are transported to any part of our body, including our muscles (making us generally weak) and internal organs (producing the signs and symptoms of abdominal discomfort, bloating, excess gas and loose stools[18]).

The second part of this description is an effect rather than a function. In contemporary physiology, the pancreas does not literally transport resources around our body; instead it enables our small intestine to absorb the resources into our blood stream, and the blood then transports the resources. Therefore, this description does not refer to a literal function of the pancreas but to an indirect *effect*—which is that the resources are *able* to be circulated, simply because the pancreas produced them.

It is possible that this *effect* may seem a mere play on words, since it may not seem to be stating anything beyond the obvious. But it is describing an observation made by the *Nei Jing* authors, which clearly seemed clinically significant. And also, it cannot be denied that it is literally true. But in Chinese medicine, descriptions of such effects only tend to remain true as long as *Nei Jing* theories are not offered to explain them.

Extract from *Su Wen*, Chapter 29

All the four limbs are supplied with [influence (*chi*)] by the stomach, but the stomach [influence] is unable to reach the [meridians] directly. It is only because of the [pancreas] that the four limbs get their supplies. Now, when the [pancreas] has a disease and is unable to move the body liquids on behalf of the stomach, the four limbs are not supplied with the [influence] of water and grain. Their [influence] weakens day by day; the vessel paths are no longer passable. The sinews and the bones, the muscles and the flesh, none of them has [influence] to live. Hence, they do not function.[19]

In the above extract, the author offers his theory to explain this pancreas function and effect. Curiously, on first reading, the essence of this extract's description *seems* to correlate with the main pancreas function of contem-

porary physiology. The pancreas completes the digestion begun by the stomach, so that if the pancreas did not do this properly, the nutritive resources (including glucose, proteins, vitamins and minerals) would not be properly absorbed by the small intestine into the blood, therefore malnutrition would occur, resulting in the signs and symptoms mentioned.

It is the theoretical passages in the *Nei Jing* that tend to be either metaphorical or untrue (p.253); whereas its passages based on practical observation are usually fact based and have stood the test of time—such as its descriptions of the signs and symptoms associated with a particular organ's malfunction. Therefore the above *Su Wen* extract, which expresses a theory, seems remarkably accurate.

But this is only the case if the Chinese medicine notions of metabolism are ignored. These were described on pages 32 to 49. Their general notions were that some type of vapour-like essence is extracted from the food (akin to steam rising from a cooking pot) which is modified and split into separate parts, all of which are transported through the meridians, along with the blood, to every part of our body, with the separate parts of the vapour performing different roles. There was no notion that oxygen (clear influence) was required to enable glucose (food influence, or constructive influence) to be made use of by our body tissue; no notion that our small intestine played any part in absorbing nutrients; and the details of the roles played by the other organs also varied between different authors within the *Nei Jing*, leaving a tangled web of contradictions.

This is only to be expected when none of this knowledge was based on practical observation of our body's inner workings; but instead on the speculations of intellectuals, using the analogy of their state's administration. The upshot is that all their above notions of metabolism are untrue.

When the above *Su Wen* extract is considered in this light, the statement that the pancreas "moves the body fluids on the part of the stomach" is now understood to mean something quite different to the notion in contemporary physiology—that the pancreas completes the digestion begun by the stomach. The flow of substances in contemporary metabolism is entirely different from that in *this* version of *Nei Jing* metabolism, or in any other version of it. It is only when considering this *Su Wen* extract in isolation of the other passages in the *Nei Jing* that it *appears* to resemble the pancreas function of contemporary physiology.

In today's Chinese medicine, the descriptions of an organ's effects, such as the pancreas "enabling the digested resources to be transported around our body" only remain true as long as the *Nei Jing* theories of metabolism are not cited to attempt to explain *why* the organ has this effect. In other words, such descriptions are only useful clinically, and in discussions with patients, as long as they are left as a general overview.

It should also be born in mind that the general inaccuracy of such *Nei Jing* theories does not in any way diminish the power of acupuncture or Chinese medicine. Acupuncture was not invented by the Chinese; it is a natural phenomenon in our body that has always existed (p.18); therefore the *Nei Jing* theories on *how* acupuncture (and our body) works, even though not factual, do not in any

way affect the outcome of acupuncture treatments.

The advantage of Chinese medicine

In some areas (*because* of its approach) Chinese medicine achieves results that are yet to be matched by contemporary medicine.

The signs and symptoms related to each organ's malfunction were identified through practical observation, and this was done *before* any theories were developed to attempt to explain those signs and symptoms and how our body produces them—the theories came later (p.253). This means that, no matter how inaccurate the later theories are, the associations of the signs and symptoms with a particular organ's malfunction are fact based; and when acupuncture corrects an organ's malfunction, the signs and symptoms are cleared and the person's health improves.

In contrast to this, contemporary medicine is often unable to account for the signs and symptoms that Chinese acupuncture routinely treats. For example, when trying to account for the intestinal symptoms of abdominal bloating, discomfort, excess gas and loose stools, there is no knowledge in contemporary physiology that is able to properly explain them. Therefore such symptoms are usually regarded as being without explanation and the condition is labelled a *syndrome*, which means a collection of symptoms with no known cause. And in this case the term "irritable bowel syndrome" (IBS) is used to describe the condition. However, the fact remains that through practical observation in ancient China, these symptoms were all observed to occur when the pancreas function was poor, and once the pancreas function is successfully treated with acupuncture, the symptoms clear.

Patient example
Male, aged 56. This patient had poor energy, a poor appetite, poor sense of taste, soft stools, and felt tired after eating, all of which cleared with treatment. See the full case history on page 238.

Patient example
Male, aged 49. This patient had a long history of IBS, which responded well to treatment. See the full case history on page 245.

It could be said that labelling this condition a syndrome (of "unknown cause") is inappropriate, since there *is* an indirect link between the pancreas and these symptoms—in contemporary physiology. The small intestine is about five metres long in an adult and is the main site in the digestive system where nutrients are absorbed into the blood stream. The process of absorption is heavily dependent on the enzymes secreted by the pancreas. It is therefore not difficult to imagine that when the pancreas function is poor, the workings of the small intestine would be heavily affected, which may account for the intestinal symptoms of a bloated and tender abdomen, excess gas and loose stools. And the weakness and emaciation in the person would be the obvious result of this poor digestion.

However, it should be acknowledged that the Chinese acupuncture treatment of the pancreas (which clears this condition—and is described later) probably could not currently be explained in biochemical terms. Chinese acupuncture has no idea how our body works at the chemical level—and does not *need* to know this—so it can provide no assistance in

this matter. Therefore, in contemporary medicine, the condition will probably continue to be regarded as being of "unknown cause".

Explanation of Chinese medicine terms

In today's Chinese medicine, to describe the main pancreas function and effect it is usually said that the pancreas "governs transportation and transformation".[20] The term "transformation" is usually understood to mean the transformation of food into the resources our body needs, which, in *Nei Jing* terms, are the various influences (*chi*), blood and liquids. And the term "transportation" is usually understood to mean the transmission of these substances around our body. The pancreas is also understood to be the main digestive organ, in that it "governs" these processes. To translate this description into something more meaningful to today's readers, I describe the function and effect as "completes digestion, enabling the digested resources to be transported around our body". But is this a valid translation of today's Chinese medicine phrase?

When textbooks and practitioners use this phrase (that the pancreas "governs transportation and transformation"), the meaning they have in mind is usually a literal belief in selected aspects of *Nei Jing* metabolism. They understand "transformation" to mean that the pancreas enables and oversees the transformation of ingested food and liquids into the various influences (*chi*), blood and body liquids; and they understand "transportation" to mean that the pancreas enables, or directly produces, the circulation of such resources around the meridian network. These are *selected* ideas from *Nei Jing* metabolism (there is no definitive version of *Nei Jing* metabolism, due to the contradictions from different authors—p.115), but, even though selective, every detail is still untrue. Influences do not really exist, and neither these nor blood really flow in the meridians (pp.40-49), and the circulation of these (in effect) "imaginary" substances is not effected by the pancreas (in contemporary physiology). Even any analogous substances within contemporary physiology—such as glucose, fats, vitamins and minerals, blood, or oxygen—are not circulated by the pancreas.

The Chinese medicine organ functions and effects only remain true, as long as *Nei Jing* metabolism is not cited to attempt to explain *how* they are produced. In recognising this, my translation of this description is expressed in a way that is both meaningful to today's readers, and also avoids any mention of *how* the effects are produced. Thus this main pancreas function and effect remains fact based.

Note that there is nothing wrong with students or practitioners referring in their own mind to the *Nei Jing* theories of metabolism and physiology, as long as it is realized that the Chinese medicine described by such theories is conceptual only, and is certainly not literally true, so that a practitioner should not expect to be able to mention such theories to patients or to anyone outside of Chinese medicine and remain credible.

2. Provides strength and substance to our muscles

The *Nei Jing* authors also noticed that when a person's pancreas function was poor for some time, the muscles of their limbs became weak and soft.[21]

As said on page 54, this is an effect rather than a direct function. The pancreas (in contemporary physiology) enables the completion of digestion and then regulates the uptake of glucose. It is the presence, or absence, of the digested resources that then produces the effect. When these resources are not present, malnourishment results. In this situation, the initial poor pancreas function would have resulted in us becoming weak and having wasted muscles.

In today's Chinese medicine, to explain this effect it is usually said that the pancreas "dominates the muscles and the four limbs".[22] When the "four limbs" are referred to in the *Nei Jing*, this usually means their functioning, which, in other words, means our ability to move about. And this could also be understood as meaning our general strength and stamina.

3. Produces our sense of taste and lip colour

It was noticed that when the pancreas function was poor, the patient experienced a weak sense of taste or even no sense of taste at all,[23] and also had pale lips;[24] and that after the pancreas was successfully treated, the patient's sense of taste returned and their lips regained their normal redness.

The production of our lip colour is certainly an effect rather than a function. And the production of our sense of taste is probably also an effect, though this is uncertain. There is the possibility that this could be a direct function of the pancreas, in the same way that the production of our appetite is recognised as a pancreas function in contemporary physiology. However, this pancreas effect (or possible function) has not been fully explored in contemporary physiology, so it is not possible to determine whether it is a direct function or an indirect effect. Physiologically, nerves from the taste buds activate parasympathetic nerves that enter the pancreas, providing a direct neuronal link between our taste buds and pancreas.[25] This does provide a direct informational link between the two, so that there is at least the possibility that the pancreas may directly produce (or contribute to) our sense of taste—in contemporary physiology.

The only thing that can be said for certain is that both these effects (or the function and effect) are fact based, since they were based on practical observation by the *Nei Jing* authors and are still routinely encountered in clinic today.

In today's Chinese medicine, these effects are usually expressed by saying the pancreas "opens into the mouth and manifests on the lips",[26] the term *opens into the mouth* meaning there is a strong association between the pancreas and our sense of taste.

4. Prevents haemorrhage

It was noticed that when the pancreas function was poor for an extended period, some patients suffered various kinds of haemorrhage, such as

- blood in the stools,[27]
- uterine bleeding,
- purplish spots or patches on the skin, and
- the tendency to bruise easily.

And after the pancreas was successfully treated, these signs tended to clear, which led

to the observation that the pancreas prevents haemorrhage.

This is certainly an effect rather than a function. In contemporary physiology, the pancreas has no direct control over our blood vessels, nor over whether the blood maintains its proper place in the vessels or tissue. Its main function is focused on enabling the small intestine to complete digestion. But nonetheless, this effect is still a fact-based observation—that when the pancreas function has been poor for some time, haemorrhages tend to occur.

In contemporary physiology, haemorrhaging is most often associated with either a reduced platelet count or with vitamin K deficiency. Reduced platelet production would usually be due to bone marrow deficiencies; and vitamin K is usually synthesised in the intestine by bacterial action.[28] However, contemporary physiology does not currently associate these factors with poor pancreas function, which does not, of course, mean there is no link. Contemporary physiology also does not associate poor pancreas function with the symptoms of IBS, yet within Chinese medicine this association has been known for over two thousand years—and was discovered through practical observation, in the same way that the association between poor pancreas function and haemorrhaging was.

In the same way that poor pancreas function affects the function of our intestine (to produce the symptoms of IBS), it is possible that it may also affect the synthesis of vitamin K within our intestines, which would account for the signs of haemorrhaging. It is also possible that the malnutrition that would result from poor pancreas function could lead to a deficiency in our bone marrow, reducing platelet production, which could also account for haemorrhaging. These points are speculation. However, even though contemporary physiology is currently not able to explain some of the common disease mechanisms known in Chinese medicine (such as the association of the pancreas with IBS, the "kidneys" with asthma and hay fever, and the liver with many stress-related signs and symptoms) this may change in the future. For now, all that can be said is the these *Nei Jing* symptomatic observations are clearly fact based—since they are still routinely encountered in clinic today.

In today's Chinese medicine, this effect is usually expressed by saying the pancreas is responsible for "controlling the blood".[29] I have translated this to "prevents haemorrhage", since it implies an indirect effect rather than the direct function of "controlling" the blood, which the pancreas does not literally do.

5. Counters the effect of gravity on our organs

It was noticed that when the pancreas function was poor for some time, signs and symptoms could occur featuring an unnatural downward movement in the body (which signs and symptoms cleared once the pancreas was successfully treated), such as

- a bearing-down sensation in the abdomen;
- prolapse of the anus; and
- prolapse of organs such as the uterus, stomach, kidneys or bladder.

This is clearly an effect rather than a direct function. And one way to account for this

effect using contemporary notions of physiology is as follows. The pancreas enables our body to obtain energy and nutrition from the food we eat, which then nourishes our muscles and also the tissue of each organ. And in the same way that our muscles lose volume and become flaccid when we are malnourished, our internal organs may also suffer similar effects—becoming weak and possibly flaccid and (to some degree) losing their proper form. In this state, they would tend to no longer retain their proper place in our abdomen.

6. Has mental and emotional functions

From the time of the *Nei Jing*, a connection was noticed between our mental and emotional activity and the functioning of our organs—such that it appeared that each of our main organs produced certain thoughts or emotions.

> **Extract from *Ling Shu*, Chapter 8**
> The liver stores the blood. The blood hosts the *hun* soul. The liver [influence (*chi*)]... if replete, then rage results. The [pancreas] stores the [constructive influence (*ying chi*)]. The [constructive influence] hosts the intentions.... The heart stores the vessels. The vessels host the spirit. The heart [influence]: if depleted, then the patient will be grieved. If replete, then he will laugh without end. The lung stores the [influences]. The influences host the *po* soul.... The kidneys store the essence. The essence hosts the mind."[30]

In this passage, the theories expressed as to how each organ produces its mental or emotional activity are not significant. These, like many of the theories in the *Nei Jing*, tend to be either metaphorical and not intended to be interpreted literally, or simply untrue (p.253).

To take the "heart" theory as an example—the passage states that the heart is associated with the "vessels" (which, at that time, meant only the meridians, which the blood was considered to be transported through, since the blood circulatory system was then unknown—p.42), and that these "meridians" host the "spirit" (which was considered to be the portion of the heart that produces its particular mental and emotional traits). Then, the passage states that when the heart influence (heart *chi*—which would have been understood as some kind of vapour that contained some essence of the heart's current state), when this vapour becomes either depleted or replete (as it flows through the meridians), then it is this changed state that somehow produces the mental traits of the patient being either "grieved" or "laugh[ing] without end". The quality of being "grieved" is open to interpretation, but the trait of laughing "inappropriately" is certainly one that in clinic is still clearly associated with heart problems. But as to the theory about *how* these states are produced by the heart, if this is interpreted literally then it is clearly untrue, since the influences do not really exist anyway (pp.40-49), so that their state within the meridians also does not exist and could not therefore produce these emotions. But further, the idea of our thoughts and emotions being produced within the meridians does not seem credible. This thinking was perhaps a product of the *Nei Jing* notion that all states in our body are the result of the movement of influences through the meridians.

However, if we choose to be generous for a moment and interpret the theory as being intended metaphorically, then I can see the validity of it. The state of the heart influence (heart *chi*) in the heart meridian was thought to directly reflect the state of the heart; and when the theory states that it is the heart influence in the meridian becoming either replete or depleted that produces the mental or emotional states, this could be understood as meaning that the function of the heart itself is changed, and that it is this changed function in the heart that produces the mental or emotional state. This I can accept as being true. But I do not believe the *Nei Jing* authors intended their theory to be metaphorical; I believe they understood it to be literally true—but each reader must decide this for themselves.

Likewise, the extract states that the pancreas stores the constructive influence (*ying chi*), and that the constructive influence hosts the "intentions".

Incidentally, when interpreting any passage from the *Nei Jing* that expresses a theory, it should be remembered that other *Nei Jing* authors (in separate chapters) will sometimes express a conflicting theory,* which should caution the reader about accepting any passage at face value.

This particular passage seems to be expressing the theory that the mental activity associated with the pancreas comes from something extracted from the food we eat (i.e. the constructive influence), rather than from the pancreas itself. At face value, this would have to be dismissed as nonsense. However, interpreting the passage metaphorically, I can see its validity. As expressed below and in the following chapter, the pancreas is responsible for digesting our food, and this function appears to be used by our conscious mind to also digest our thoughts. The "constructive influence" is a theoretical vapour-like substance that our stomach and pancreas extract from the food we eat, and which contains some essence of the original food that can be used to nourish any part of our body. When our conscious mind uses our pancreas to digest a thought, the thought takes the place of the physical food the pancreas normally digests, and it is thought that the pancreas may process that thought in the same way it processes the food (p.83). In other words, the contents of our thoughts are equivalent to the contents of our food; i.e. the constructive influence. Therefore, to say that the constructive influence hosts the "intentions" (i.e. the pancreas's mental and emotional functions) is not too far from the truth—when viewed metaphorically. But again, I think it is more likely that the *Nei Jing* author understood their theory to be literally true.

However, the significant aspect of the above *Ling Shu* extract (and any other similar passage), is not the theories expressed about how or why the symptoms are produced, but simply the fact that the *Nei Jing* authors associated mental and emotional traits with the main organs. It is true that, to an outsider (someone not familiar with Chinese medicine), these untrue theories tend to devalue such passages. But putting the theories aside, the mental and emotional traits associated with the organs are still routinely seen in clinic today—and this book presents a some-

* See Chapter 2, on Chinese medicine metabolism, particularly pp.32-49.

what different explanation for how they may be produced (see below).

A more impressive passage on this topic is Section 16 of the *Nan Jing*. This passage sticks entirely to the facts, without theorizing about them. It discusses how organ malfunction can be diagnosed. Once such an "illness" has been detected in the "pulses", it states that the illness can be confirmed by the presence of the main physical, mental or emotional signs and symptoms that were known to be present when any of the five main organs were "afflicted". On the pancreas, it states

> **Extract from *Nan Jing*, Section 16**
> Consider feeling a movement in the vessels that is associated with an illness in the [pancreas]. External evidence of such an illness includes a yellow face, a tendency to belch, a tendency to ponder, and a fondness of tasty food.... The illness, as perceived by the patient, consists of a swollen and full abdomen; his food is not digested; his body feels heavy and the joints ache. He is tired and weary, desires to lie down, and is unable to pull his four limbs together. If this evidence is present, the [pancreas] is afflicted. If it is not present, the [pancreas] is not afflicted.[31]

Note that "a tendency to ponder" is cited as the main mental trait associated with the pancreas, which, in my experience, is more clinically accurate, and useful, than the description of the pancreas as housing "intention". And this is supported by Chapter 5 of the *Su Wen*, which, when describing the traits associated with the pancreas, states "among the states of mind it is pensiveness".[32] Today, "pensive" is defined as "deeply or seriously thoughtful, often with a tinge of sadness".[33] This seems to perfectly describe the manner of a person whose conscious mind is dominated by this aspect of the pancreas function.

For contemporary readers, the notion of our abdominal organs playing any part in our mental and emotional activity may be hard to accept. But this ancient knowledge was based on practical observation; and the associations of certain thoughts and emotions with certain organs is still routinely seen in clinic today.

Since this subject is so clinically significant, the whole of Chapter 4 is devoted to exploring it. Using concepts from contemporary physiology, the chapter provides detailed explanations of how it may be possible for our main abdominal organs to produce many aspects of our mental activity—and conversely, for similar mental activity to be able to impede the functioning of our abdominal organs. But for now, the following introduces the topic.

It is clear that our pancreas provides us with the ability to mentally digest facts, just as it provides us with the ability to digest food. The following observations (amongst others), which are routinely encountered in clinic, support this notion.

Habitual thinkers tend to develop poor pancreas function. And when such people then indulge in a bout of intensive thinking, this usually weakens further their pancreas function, producing a flare up of the related signs and symptoms, such as feeling bloated and tired after eating, having a tender abdomen, poor energy, frequent loose stools, excess gas, and intolerances to certain foods. It is as though the pancreas's resources are drained by the activity of us mentally digesting facts.

Further (some time *after* the *Nei Jing*), it was recognised that the activity of our organs

have a daily rhythm and each organ is most active in a particular two hour period (p.367). The pancreas function is known to be strongest between the hours of nine and eleven a.m., and to then gradually diminish until it reaches its weakest at nine p.m. And the habitual thinkers who develop poor pancreas function find they can think clearly only in the morning, until about midday, and if they try to mentally digest facts later in the day, they find this increasingly difficult. This suggests that our ability to mentally digest facts depends on the strength of our pancreas function. In other words, that it is our pancreas that is responsible for this ability. And also, if this mental ability were a function of our brain alone, unrelated to our pancreas function, it would not be time dependent.

Today, this is a common pattern amongst students or any person whose work involves heavy thinking. And when revising for exams or when the demands of their work are intensified, this can induce a flare up of the signs and symptoms of poor pancreas function (known as IBS in contemporary medicine).

And even our own recent ancestors appear to have had an awareness of the possible association between our organs and thoughts, since this awareness is fossilized in our very language. We still use phrases such as "food for thought" and "chewing over an idea" which suggest the knowledge that our digestive organs are associated with our ability to mentally digest facts; and phrases such as having a "gut feeling" or a "gut instinct", indicating that instinctive ideas seem to somehow come from within our abdomen.

A possible physiological explanation of how our pancreas could provide us with this mental ability is given in Chapter 4.

Improper function

When the pancreas function is poor and the condition has been present for some time, any of the above mentioned pancreas functions and effects could become defective, which could cause a *selection* of the following signs and symptoms to occur:

- poor appetite[13] (prefer to only eat small amounts);
- general weakness[11] (and hence the tendency to avoid speaking),[34] and feeling tired after eating;
- abdominal bloating and discomfort[14] (particularly after eating), excess gas,[15] frequent loose stools[16];
- intolerances for certain foods, such as dairy or wheat;
- poor sense of taste[23];
- cravings for sweet food (p.72);
- muscles of limbs are weak and soft (emaciated)[12];
- tendency to bruise easily or have mild haemorrhages or purple spots or patches on the skin, blood in the stools, excessive menstrual flow or bleeding of the uterus[27];
- feeling a bearing-down sensation in the abdomen, possibly with prolapse of the anus or of internal organs such as the stomach, kidneys, uterus or bladder; and
- pain or discomfort anywhere along the pancreas or stomach meridian.[35]

People with this condition would tend to be habitual thinkers or worriers,[36] and all the above signs and symptoms would tend to be

made worse after extended periods of heavy thinking or studying.

Today's Chinese medicine term for this condition is analogous to "poor pancreas function". The condition would usually be called "Pancreas chi deficiency" (or, in other texts, "Spleen chi deficiency"). Using this book's convention, this would be written "Pancreas influence deficiency". The phrase "pancreas influence" is analogous to "pancreas function" (p.27), therefore today's Chinese medicine term for the condition is analogous to "poor pancreas function".

How a diagnosis is made

When a patient first comes for treatment, they often have problems with several of their main organs but have come to clinic to address a single issue which is often a complication of one of the main problems. I would usually begin by asking whether they had certain signs and symptoms related to each of the main organs. If the patient had around three of the signs and symptoms listed above, this would suggest they had poor pancreas function, and I would confirm this by examining their pulses and tongue (see the *Nan Jing* extract on page 63 above).

Facial colour and tone of voice

This initial questioning could also be guided by my impressions of the patient, including their general manner, complexion, and the sound of their voice. When poor pancreas function is pronounced, there may be a yellow hue visible on their face.

Extract from *Su Wen*, Chapter 10

If the complexion is generated by the [pancreas], it resembles a *gua-lou* fruit [which, when ripe, is a shining yellow colour] wrapped up in white silk.[37]

And Chapter 37 of the *Ling Shu* states "…when the [pancreas] has a disease, the lips are yellow…",[38] where the 'lips' refers to the skin around the lips, rather than the red part.

Chapter 5 of the *Su Wen* associates a "singing" tone of voice with the pancreas.[39] And in clinic today, when a patient's health is dominated by their pancreas function, they will often have a singing quality to their tone of voice and will also often hum or sing to themselves.

The pulses

The taking of pulses has been a part of Chinese medicine from its beginnings. Today, these are taken only at the patient's wrists, though at the time of the *Nei Jing*, the "pulses" (then known as the "movement in the vessels") were felt at certain acupoints on the meridian of each organ; it was the *Nan Jing* that introduced the novelty of taking all the pulses only at the wrists (p.291).

The pulse is felt in three different positions on each wrist, each position providing information about the functioning of a different organ. This is conveyed in the quality of the pulse, rather than merely its speed; and the possible qualities could involve the width of the pulse, the firmness, or tautness, the shape of the rising and falling, the strength, the depth, and so on—with each quality indicating a particular type of malfunction in the corresponding organ*.

* For a detailed description of the mechanism that enables pulses to contain this information, see page 348.

A typical pulse with poor pancreas function

When there is poor pancreas function, the pulse would often be weak and deep at the second position on the patient's right wrist (which corresponds to the pancreas*), and the pulse would tend to have a quality known as "slippery". The sensation of feeling a "slippery" pulse could be imagined as being akin to feeling treacle flowing beneath your fingers rather than water—as though the blood were thicker than it should be and moves more slowly, so that the rise and fall of the pulse may seem somewhat lazy.

The term "dampness"

"Dampness" is said to result in us when our digestion, particularly our pancreas function, is poor; or, to put it another way, when our digestive ability is unable to cope with a particular type of food we eat—in the quantities we eat it in. Hence, the state is related to our digestion.

When a person has just eaten a large meal, their pulses usually adopt a "slippery" quality. But after a short while, their digestion of the meal progresses and this quality usually clears from their pulses. However, if their pancreas function is poor, this "clearing" process may take longer, or may never completely finish, leaving the person with pulses that are permanently "slippery". This state is then known as *dampness*, which could be understood as meaning that the person's digestion is weak—and the not-properly-processed digestive substances constitute the *damp* within the person. In time, oedema may result (see below for an explanation).

The above are the facts in practical terms. But what could the presence of "dampness" be equated to in contemporary physiology? In other words, what effects might happen in our body due to poor pancreas function?

The "slippery" pulse after eating, represents a state in the functioning of our organs—as all Chinese medicine pulses do. In our blood (in contemporary physiology), the products of digestion are being circulated, and there is a sudden surplus of glucose (our body's main fuel) and also proteins and fats. All our organs would be exposed to this sudden surplus, therefore the "slippery" pulse quality usually appears in all pulse positions. But this excess of glucose, fats and proteins is usually regulated and returns to normal. This regulation is performed by

- our pancreas, by secreting *insulin* and *glucagon* to control the uptake of glucose—p.53;
- our liver, which stores much of the glucose for use later, and converts fats into *triglyceride* to store them in the fatty tissues of our body—p.89;
- our kidneys, which also store glucose for use later, just as our liver does—p.143; and
- our adrenal glands, which regulate our blood glucose level by counteracting insulin, and play a significant role in releasing the stored glucose from our liver, kidneys and muscle tissue, and also mobilize the energy stored in our body's fat reserves—p.144.

When this "slippery" quality remains in a person's pulses throughout the day, this sug-

* The pulse positions are shown on page 348.

gests that some part of all the above regulation is not working properly.

From Chinese medicine observations, it is clear that this state usually begins with poor pancreas function, but any of the other organs mentioned above may also be involved. However, since the treatment focuses on the pancreas, this may be the main organ involved. In contemporary physiology, it is possible that this simply consists of a malfunction in the pancreas's ability to control the uptake of glucose, but to a lesser degree than exists in diabetes—to be, perhaps, the forerunner of diabetes.

Also in contemporary physiology, it is probably not possible to accurately define all the processes and organs involved in producing the state known as "dampness" in Chinese medicine. But it could perhaps be best visualized as follows. The products of our digestion are not properly regulated, and due to this "fault" in the energy supply to all our organs and processes, the organ functions become "sluggish", and in time oedema may develop, which may be explained as follows.

In Chinese medicine, the term "kidneys" includes the kidneys and adrenal glands (p.143), and both these structures work closely with the pancreas to regulate the processing, storage and supply of glucose. Once the poor pancreas function fails to properly regulate the uptake of glucose, this may impede the function of any other organ also involved in this process, including the "kidneys", and once the kidney function is impeded, this may produce the oedema (p.153).

Tongue examination

In Chinese medicine, it is recognised that the malfunction or our organs produces visible changes to various aspects of our tongue. On the body of our tongue, different areas are associated with particular organs and when an organ has been stressed for some time, its associated area may have a changed body colour (it may be unusually red or pale); or there may be a change in the tongue shape, such as a dip in that area; or the tongue coating may show a change in its thickness or colour (p.371).

The stomach and pancreas are associated with the central area of the tongue, and with poor pancreas function there may be a dip in this region. But more reliably the tongue's general body shape would tend to be noticeably swollen with teeth indentations along both sides.

In clinic, this type of tongue is a reliable indication of poor pancreas function. And I also find that people with such a tongue are, without fail, heavy thinkers or worriers. This has often caused me to wonder which came first. Was it that the person developed poor pancreas function, which then caused them to become habitual thinkers; or were they always prone to continuously thinking, which led to them developing poor pancreas function, which in turn tended to worsen their thinking habits (since the thinking became harder) and the more they indulged, the more this weakened their pancreas function, so worsening their digestive symptoms, until they arrived at an impasse where they suffered chronic digestive symptoms and could not think clearly. This, of course, is the worst case scenario, but many habitual thinkers or worriers may be able to relate to the description. As to which came first, it may not be possible to tell; the only certain thing is that poor pancreas func-

tion and heavy thinking seem to go hand-in-hand.

Treating poor pancreas function

Once diagnosed, an acupoint would be selected to strengthen the pancreas function. Some typical acupoints are Stomach-36 (*Zusanli*), Pancreas-6* (*Sanyinjiao*), Pancreas-3† (*Taibai*) and Bladder-20 (*Pishu*).

Note that usually only a single acupoint would be used. In acupuncture, there is often a choice of several different acupoints that could achieve the same effect, and the above are amongst the most commonly used acupoints to affect the pancreas function.

When poor pancreas function has been present for some time, these acupoints tend to feel tender when pressed, due to the association between the pancreas and these locations. According to the BSF hypothesis (p.359), when one of these acupoints is needled, this same association is utilized but in reverse, which seems to encourage the pancreas to cancel out the malfunction in itself that caused the tenderness, and the pancreas function returns to normal. The pancreas pulse would then become much stronger (where it was previously weak) and usually change in quality.

Since the problem is corrected by the organ itself, is hormonal activity also normalized?

The monitoring of our body's hormonal activity (or of any similar factors in our blood considered in contemporary physiology) plays no part in Chinese medicine. However, since part of this book's purpose is to relate Chinese medicine to contemporary physiology, this issue needs to be commented on.

Acupuncture utilizes the associations between our organs and specific locations on the meridians to encourage our organs to cancel out any malfunctions themselves. And once a course of treatments is successful, the person feels good and any signs and symptoms they previously suffered in relation to the treated organ would have cleared—which is one of the measures of the treatment's success. Since hormones are simply an organ's communication medium, and other similar factors in our blood are merely a measure of that organ's activity, and the condition has been corrected by the organ itself, it is difficult to imagine why such factors would not also have returned to normal—assuming they were abnormal before the treatment.

For example, one key symptom experienced by people with poor pancreas function is a poor appetite. In contemporary physiology, it is considered that the secretion of the hormone *pancreatic polypeptide* (*by* the pancreas) may be responsible for producing our appetite (p.53). Once poor pancreas function is successfully treated with acupuncture, the patient's appetite usually dramatically improves. If our appetite *is* produced by the hormonal activity of the pancreas, this would suggest that the acupuncture treatment of the pancreas caused the organ to correct its hormonal activity.

Another common example is acupuncture's treatment of hay fever. In contemporary physiology, hay fever would usually be considered an immune-system issue. In Chinese medicine terms, the underlying cause of hay fever is usually poor "kidney" function. When

* Also called Spleen-6.

† Also called Spleen-3.

the "kidneys" are mentioned in Chinese medicine, this also encompasses the adrenal glands (p.143) which, from evolution's point of view, are a part of the "kidneys" and are therefore treated whenever acupuncture corrects the function of the "kidneys". The adrenal glands secrete the hormone *cortisol*. One of cortisol's many actions is the development and maintenance of normal immunity (p.144). In my clinical experience, acupuncture treatment of hay fever is usually extremely effective, often transforming the lives of life-long hay fever sufferers, who find that after successful treatment, when they are exposed to all the same allergens as before, they now experience no signs and symptoms. In contemporary physiology, the patient's immune system is now clearly working properly, whereas before the treatments, it was not, which suggests that the acupuncture treatment of the "kidneys" (which includes the adrenal glands) caused the adrenal glands to correct their hormonal activity.

The progress of treatment

In Western countries, acupuncture sessions tend to be given at weekly intervals initially, then the time between treatments is increased as the signs and symptoms improve. On the second visit, most patients report an improvement in some of their symptoms, which could include an improvement in their sense of taste, energy or digestion, with less bloating and tiredness after eating, or the absence of loose stools; and some even report an improvement in their ability to think, with their mind seeming more clear. After the first session, this improvement may only last for a day or two, particularly when the symptoms were present for many years. But after each successive treatment, the improvements usually last longer, until the patient remains symptom free between treatments. At this point, the interval between treatments is increased. Many patients then only return for a further treatment once they start to feel less well. This might be once a month or even just once a season, depending on how stressful their life is.

Patient example
Male, aged 56. This patient had a wide range of symptoms that had built up for years, including poor appetite, feeling tired after eating, having a poor sense of taste, sweet cravings, loose stools, and he found it hard to think after midday. All these symptoms cleared after a few treatments. See the full case history on page 238.

The value of regular maintenance treatments

Once a patient's health problem has been resolved, they usually appreciate the value of good health and realize that this can be maintained by regular treatments, with the frequency being determined by the degree of stress in their life.

Extract from the *Su Wen*, Chapter 2
The sages did not treat those already ill, but treated those not yet ill; they did not put in order what was already in disorder, but put in order what was not yet in disorder.... Now, when [treatment is sought] only after a disease has become fully developed—when attempts at restoring order are initiated only after disorder has fully developed—this is as if a well were dug when one is thirsty, and as if weapons were cast when the fight is on. Would this not be too late?[40]

End of extract

References and endnotes

Abbreviations used

SW-n: *Su Wen*, Chapter n
LS-n: *Ling Shu*, Chapter n
NJ-n: *Nan Jing*, Section n
fn. footnote
en. endnote

Chapter 1

[1] Hu Hou-hsüan, 1944, p.11a. Cited by Unschuld, 1985, p.21.

[2] Chang Tsung-Tung, 1970, p.69. Cited by Unschuld, 1985, p.21.

[3] Akatsuka Tadashi, quoted in Kanō Yoshimitsu 1980, p.283. Cited by Unschuld, 1985, p.25.

[4] Wilhelm, 1930, pp.32-33. Cited by Unschuld, 1985, p.36.

[5] Unschuld, 1985, p.36.

[6] Ssu-miao, 1965, p.347. Cited by Unschuld, 1985, p.45.

[7] Eichhorn, 1976, p.27. Cited by Unschuld, 1985, p.35.

[8] Unschuld, 1985, pp.54-55.

[9] Ibid., p.58.

[10] Yamada, 1979. Cited by Unschuld, 1985, p.63.

[11] Unschuld, 1985, pp.56-61.

[12] Unschuld, 1986, p.3.

[13] *Wu-shih-erh ping fang*, 1979, pp.1-20. Cited by Unschuld, 1985, p74.

[14] Ssu-ma, 1969. Cited by Unschuld, 1985, p.93.

[15] Unschuld, 1985, pp.92-97.

[16] LS-12 states "His outer appearance can be measured. His structures can be followed and pressed with the fingers so as to locate them. Once he has died, he may be dissected to observe his interior appearance. Whether the long-term depots are firm or brittle…" (Unschuld, 2016, p.217). In LS-31, the size, shape and path of the stomach and intestines are given in some detail, which could only have been determined by dissection of a corpse (Unschuld, 2016, pp.355-356). And in NJ-42, the size, shape and dimensions of every organ is given in detail (Unschuld, 1986, pp.416-8). See also Unschuld, 1985, pp.213-215 and 236-238.

[17] Unschuld, 1985, pp.78-79.

[18] In Unschuld's early translations of the *Nan Jing* (1986) and the *Su Wen* (2011), he translates *zang* as "depot" and *fu* as "palace"; whereas in his later translation of the *Ling Shu* (2016), he now translates *zang* as "long-term depot" and *fu* as "short-term repository". The non-medical meaning of *fu* was clear, but its use in the medical context was less easy to translate, and this is reflected in his changed translation of the term. During the late Zhou and early Han dynasty, the meaning of *fu* changed, from "short-term storage facility", to also signify venues of administration, and subse-

quently a palace where an administrator resides. Hence, Unschuld's translation of *fu* as "palace" (see Unschuld, 2011, pp.16-18). In his 2016 translation of the *Ling Shu*, he now prefers the term "short-term repository" instead of "palace" as a translation of *fu* (see Unschuld, 2016, p.13, footnote 11). Whatever his reason for the changed translation, to me, this new choice does seem more suitable, since I previously found the term "palace" misleading. It suggests a more important organ than a depot might represent; whereas the depots (the *zang*, or *yin* organs) are in fact the more important organs.

[19] Unschuld, 2011, Vol I, p.16; or Unschuld, 1985, pp.81-82.

[20] Yang Shang-shan, 1981, pp.63-69. Cited by Unschuld, 1985, p.82.

[21] Unschuld, 1985, p.82.

[22] LS-28 states "…As for the very first origin of all diseases, they all originate from wind, rain, cold and summer heat, from yin and yang [influences (*chi*)], joy and anger, from beverages and food and from living conditions, from being severely scared and from sudden fear. Then blood and [influences] may separate; the yin and the yang [influences] may be destroyed; the conduits and network vessels may have receding [influences], and circulation may even be interrupted, with the vessel paths being impassable…" Unschuld, 2016, p.328.

[23] Tian, 2007.

[24] Unschuld, 2011, Vol I, pp.155-159 (SW-8).

[25] Unschuld, 1985, p.67

[26] Unschuld, 2011, Vol II, pp.244-284 (SW-69).

[27] Unschuld, 1985, p.81.

[28] See Unschuld, 1985, p.71; Unschuld, 2016, pp.603-612 (LS-66); Unschuld, 2016, pp.739-751 (LS-79).

[29] See the commentaries in the Unschuld translation of the *Nan Jing*: Unschuld, 1986.

[30] The evidence to support this hypothesis is described in Chapters 16-19, and the hypothesis is summarized on page 359.

Chapter 2

[1] Unschuld, 1985, pp.71-73. See also Unschuld's introduction to his translation of the *Nan Jing*: Unschuld, 1986. pp.13-14.

[2] Cited by Unschuld, 1986, p.349. The comment was made as a commentary on Section 31 of the *Nan Jing*, when Yü Shu wrote "The *Ling Shu* states 'The upper section of the [*san jiao*] resembles fog'. That is to say, when it passes the influences, that resembles mist gently flowing into all the [meridians]."

[3] Unschuld, 1985, pp.75-78.

[4] In SW-56, it states "When evil settles in the skin, then the interstice structures open. When they have opened, then the evil enters the [collaterals (*luo mai*)] and settles there. When the [collaterals] are full, then it pours into the [meridians]. When the [meridians] are full, then [the evil] enters the [organs] and lodges there." (Unschuld, 2011, Vol II, p.42.)

[5] "Jing" is defined, rather poetically, in LS-30, which states "When the two spirits strike at each other, their union results in the formation of a physical appearance. That which usually precedes the generation of a human body, it is called 'essence'." (Unschuld, 2016, p.351.) The phrase *two spirits strike at each other* is referring to the sexual union of a man and woman. This results in a *physical appearance* (i.e. the start of a foetus), and "that which preceded" this (the merging of the "two spirits"; i.e. the combining of the genetic and "energetic" blueprints of the two people—p.167), this is the essence passed on to the new person.

[6] Cheng X, 1999, p.52.

[7] Unschuld, 2016, p.352 (LS-30).

[8] LS-59 describes the process of "draining" excess influence through various "holes" (Unschuld, 2016, p.538), as do many passages throughout the

Nei Jing. And LS-71 describes the "opening of clogged ditches" in the context of clearing "evil visitors" (pathogens) from the meridians (Unschuld, 2016, p.633).

[9] Unschuld, 2011, Vol I, pp.668-669 (SW-45).

[10] Ibid., p.586 (SW-39).

[11] Unschuld, 2011, Vol II, pp.40-41 (SW-56). The next sentence following the extract reads "In case it consists of plenty of heat, then this causes the sinews to slacken and the bones to waste, the flesh to melt away, and the protuberant muscles to be destroyed. The body hair stands up straight and breaks." I omitted this because I felt the language, whether it be intended literally or metaphorically, requires too much imaginative interpretation on the part of today's reader to be able to take it seriously. Such imaginative adventures are left to those students who wish to refer to the original texts to make what they can of them.

[12] Unschuld, 2016, p.254 (LS-17).

[13] Ibid., p.42 (LS-1).

[14] Unschuld, 2011, Vol II, p.44 (SW-57). The context of this passage is a discussion of colours that supposedly become visible in the various vessels—supposing that each meridian is capable of adopting the same colour that its related organ can sometimes produce in our complexion. Personally, I believe this may be a theoretical notion inspired by the five phase correspondences, and therefore does not apply in reality (p.255). However, the important content is contained in the commentary, which is not related to these supposed colours.

[15] Zhang Jiebin. Cited by Unschuld, 2011, Vol II, p.44, fn.3.

[16] Unschuld, 2016, pp.766-767 (LS-81).

[17] Ibid., pp.401-404 (LS-39).

[18] "…the *Suwen* was not the work of a single author. …it combines texts written by numerous authors over an extended period of time. However, this *extended period of time* may…have lasted for no more than two centuries." (Unschuld, 2011, p11). "Much of the version [of the *Ling Shu*] known today probably dates back to individual, shorter texts that began to be written between the 2nd and 1st centuries BCE…. The authors of these texts are unknown, as is the individual who, at some point in that time, collected the individual texts into one great work." (Unschuld, 2016, p.1).

[19] Unschuld, 2016, pp.249-251 (LS-16).

[20] Ibid., p.555 (LS-60).

[21] Ibid., p.565 (LS-62).

[22] Ibid., p.447 (LS-47).

[23] Unschuld, 2011, Vol I, p.191 (SW-10).

[24] A Chinese anatomy chart from much later states that "The body of the liver is solid; it cannot be compared to the intestines, stomach, and bladder. As a result, it is unable to store blood as the ancients stated" (Cited by Berk, 1986). However, no date is given for the chart. Berk's book translates ancient Chinese Kung-fu texts, the earliest dating from 1591 AD, so it may be assumed that the anatomy charts date from around this period. It is interesting that the "ancients" got the facts right (working from pure logic) but that this later author (his observations being clearly gained from dissection) got the facts wrong. But this would not have been known until recent physiology studies "discovered" the fact that the liver stores the blood.

[25] Unschuld, 2011, Vol I, p.649 (SW-43).

[26] Ibid., p.372-376 (SW-21).

[27] Unschuld, 2016, pp.523-4 (LS-56).

[28] Ibid., pp.631-632 (LS-71).

[29] Unschuld, 2011, Vol I, pp.584-586 (SW-39).

[30] Li, 1987. Cited by Unschuld, 2011, Vol I, p.585, fn8.

[31] Unschuld, 2016, pp.259-260 (LS-18).

[32] Unschuld, 1986, p.341.

[33] Cited by Unschuld, 1986, p.343.

[34] Cited by Unschuld, 1986, p.344.

[35] Cited by Unschuld, 1986, pp.343.

[36] Cheng X, 1999, p.41.

[37] Unschuld, 2016, pp.524 (LS-56).

[38] Cited by Unschuld, 2016, p.525, fn.4.

[39] Cited by Unschuld, 2016, p.524, fn.1.

[40] Unschuld, 2016, p.764 (LS-81).

[41] Ibid., pp.264-265 (LS-18).

[42] Maciocia, 1989, p.71.

[43] Cheng X, 1999, p.28 and 54. (It should be stated that in editions of my own book previous to June 2017, I also followed this tendency set by today's Chinese medicine textbooks—until I had thoroughly researched the *Nei Jing* and *Nan Jing*.)

[44] —Though they appear to have not considered what the process of "extracting" something from the food or air would involve, in terms of physiological stomach or lung function; or, due to the absence of knowledge of chemistry and of the microscopic anatomy of our organs, the concept of physiology (as we know it—i.e. the chemical breakdown and transformation of substances, and the microscopic workings of our body which perform such things) did not then exist, so it did not even occur to them to ponder such things. That is, as we would think of them. However, they did consider this detail using the notion of "physiology" available to them, which was a metaphorical one. They considered that such processes consisted of our stomach somehow "cooking" the food, so that the vapours rose from the food (just as happens when cooking in reality), and those vapours were then able to split into their *yin* and *yang* components and circulate our body via the meridians. However, there was no such process imagined with the lungs. It is possible that because the air was already in a vapour-like form, they imagined there was no need for our lungs to process it to transform it into a useable vapour.

[45] Cheng X, p.34, states that the lung "is closely related to the formation of pectoral *chi* [i.e. chest influence], which is formed from the combination of the essential *chi* of water and food, and the clear *chi* inhaled by the lung." This notion does not originate from the *Nei Jing*. On the same page, the book also states that the lung "inhales clear *chi* from the natural environment and exhales waste *chi* from the interior of the body". This function of exhaling waste is also a modern invention, and does not appear in the *Nei Jing* (p.40). (It should be stated that in editions of my own book previous to June 2017, I also followed this tendency set by today's Chinese medicine textbooks—until I had thoroughly researched the *Nei Jing* and *Nan Jing*.)

[46] And I would again make it clear that in editions of my own book previous to June 2017, I also followed this tendency set by today's Chinese medicine textbooks—until I had thoroughly researched the *Nei Jing* and *Nan Jing*.

[47] Unschuld, 1985, pp.75-77.

[48] Friedland, 2009.

[49] Waugh, 2001, pp.60-65.

[50] Ibid., pp.61-67.

[51] Unschuld, 2016, p.14, Introduction section (includes descriptions of why "blood is blood", etc.).

[52] Unschuld, 2011, Vol I, p.649 (SW-43).

[53] Unschuld, 2016, p.604 (LS-66).

[54] Unschuld, 2011, Vol I, p.337 (SW-19).

[55] Unschuld, 2011, Vol II, p.73 (SW-60).

[56] Unschuld, 2016, pp.604-611 (LS-66).

[57] Ibid., p.328 (LS-28).

[58] Ibid., pp.603-611 (LS-66).

[59] Unschuld, 2011, Vol I, p.72 (SW-3).

Chapter 3

[1] Betts, 2013, section: 23.6 Accessory Organs in Digestion: The Liver, Pancreas, and Gallbladder.

[2] Berg, 2002, section: 30.2, Each Organ Has a Unique Metabolic Profile.

[3] Betts, 2013, section: 17.9 The Endocrine Pancreas.

[4] Bronte, 2013.

[5] Cesta, 2006.

[6] Note that the correct attribution is also indicated by the *yin-yang* pairing of the meridians (p.332). When our bodily structures were defined during evolution, such pairings were established due to the functional relationships between the organs (Chapter 18). And due to the functional relationship between the pancreas and stomach, the pairing of these organs now makes sense. Whereas there is no conceivable reason why evolution would have paired the stomach and spleen organs, since there is no functional relationship between them (page 197 describes the functional relationship between the heart and small intestine, and page 127, that between the lungs and large intestine). This indicates that the meridian paired with the stomach meridian, should therefore be associated with the pancreas, rather than the spleen. But further, the spleen could not even be considered a *yin* organ; it is part of the lymphatic system, which is a *yang* organ (p.201), therefore evolution would not have paired it with the stomach, which is *also* a *yang* organ.

[7] Unschuld, 1986, p.417 (NJ-42).

[8] Waugh, 2001, p.133.

[9] Clearly it was not known to all, since some authors got the location of key organs wrong, such as the liver, lungs and "pancreas"; see page 262.

[10] Betts, 2013, section: 23.1 Overview of the Digestive System.

[11] "General weakness" (i.e. the four limbs not working) is associated with the pancreas in SW-29 (Unschuld, 2011, Vol I, pp.482-483); and (i.e. "the body feels heavy") in LS-35 (Unschuld, 2016, p.377); and (i.e. "the body and all its limbs feel heavy") in LS-10 (Unschuld, 2016, p.183).

[12] "Emaciation and malnutrition" (i.e. the sinews, muscles and flesh not having the "nourishment" to "live") is associated with the pancreas in SW-29 (Unschuld, 2011, Vol I, pp.482-483). And LS-10 associates "the muscles and the flesh soften" with illness of the pancreas (Unschuld, 2016, p.198).

[13] "Poor appetite" is associated with the pancreas in SW-50 (Unschuld, 2011, Vol I, p.735).

[14] "Abdominal bloating and discomfort" (i.e. "distension and obstruction") is associated with the pancreas in SW-29 (Unschuld, 2011, Vol I, pp.482-483); in SW-10 (Unschuld, 2011, Vol I, p.195); in SW-50 (Unschuld, 2011, Vol I, p.735); in LS-47 (i.e. "accumulation in the lower flanks accompanied by pain" and a "feeling of fullness and tends to develop abdominal swelling) (Unschuld, 2016, pp.452-453); and in LS-10 (i.e. "the abdomen is swollen") (Unschuld, 2016, p.183).

[15] "Excess gas" (i.e. "intestinal flush", which is defined by Wang Bing/Unschuld as "gases"—see fn.10 in following reference) is associated with the pancreas in SW-29 (Unschuld, 2011, Vol I, p.481).

[16] "Loose stools" (i.e. "outflow of undigested food") is associated with the pancreas in SW-29 (Unschuld, 2011, Vol I, p.481).

[17] SW-17 has a quaint description of loose stools: "When the granaries do not keep what they store, in this case the doors are not under control." (Unschuld, 2011, Vol I, p.279).

[18] These signs and symptoms would have been accounted for as follows. When the digestive resources are not transported to every part of our body, this could cause the influence (*chi*) to flow contrary to its normal course, which would account for the abdominal bloating and discomfort, excess gas and loose stools (see p.93).

[19] Unschuld, 2011, Vol I, pp.482-483 (SW-29).

[20] Cheng X, 1999, p.32.

[21] The notion of the "sinews, muscles and flesh" not having the "nourishment" to "live" is associated with pancreas malfunction in SW-29 (Unschuld, 2011, Vol I, pp.482-483); the notion that our "muscles and flesh soften" is associated with pancreas malfunction in LS-10 (Unschuld, 2016, p.198); and SW-10 states that "the correlate

of the pancreas is the muscle tone" (Unschuld, 2011, Vol I, p.185).

[22] Cheng X, 1999, p.33.

[23] LS-17 states "When the [influence] of the [pancreas] is in harmony, then the mouth can recognize the five types of grain." (Unschuld, 2016, p.255.) The "influence" of an organ being "in harmony" means that the organ is healthy and hence all its related functions are working well. "Recognizing the five types of grain" implies being able to distinguish all flavours. Therefore the statement means that when the pancreas is healthy, our sense of taste is strong, but when the pancreas is stressed, our sense of taste is weak.

[24] SW-10 states that the pancreas's "splendour appears in the lips" (Unschuld, 2011, Vol I, p.185).

[25] Thorens B, 2010.

[26] Cheng X, 1999, p.33.

[27] LS-60 states that "All diseases are either movements contrary to or movements in accordance with the norms," and it gives many examples of signs and symptoms that represent a movement contrary to the norms, such as a bloated abdomen, noises in the abdomen associated with a feeling of fullness, unending nosebleed, cough, discharges of blood in the urine—most of these signs and symptoms being pancreas related (Unschuld, 2016, pp.552-553).

[28] Waugh, 2001, pp.74-75.

[29] Cheng X, 1999, p.33.

[30] Unschuld, 2016, pp.152-153 (LS-8).

[31] Unschuld, 1986, p.220 (NJ-16). The following sentence is omitted from the extract. "Internal evidence of such an illness is the presence of moving influences right of the navel which, if pressed, respond with firmness and pain." See p.262, which demonstrates that this "abdominal diagnosis" is theoretical only and does not apply in reality.

[32] Unschuld, 2011, Vol I, p.108 (SW-5).

[33] Collins, 1991

[34] SW-17 states "When the speech is feeble and when it takes an entire day before he speaks again, this is [influence] deprivation." (Unschuld, 2011, Vol I, p.279).

[35] LS-10 describes the path of each meridian, then describes the signs and symptoms that may result when each meridian's associated organ is stressed. These include pains at various locations, following the path of the meridian; and in many cases even states that the toe or finger that the meridian ends at may be "useless"; i.e. either too weak or too stiff or painful to be used. In the case of the pancreas, the signs and symptoms include "the stomach duct aches, the abdomen is swollen…. a feeling of tension and pain below the heart… the inner side of their thighs and knees are swollen… the big toe is useless." (Unschuld, 2016, pp.176-184). And LS-13 also describes the path of every meridian and the "diseases" of each meridian; i.e. the signs and symptoms that might occur along the meridian when a "blockage" occurs, or when its associated organ is stressed in some way. (Unschuld, 2016, pp.225-238).

[36] NJ-16 associates "a tendency to ponder" with pancreas "affliction" (Unschuld, 1986, p.220).

[37] Unschuld, 2011, Vol I, p.189 (SW-10).

[38] Unschuld, 2016, p.390 (LS-37).

[39] Unschuld, 2011, Vol I, p.108 (SW-5).

[40] Ibid., p.57 (SW-2).

[41] Ibid., pp.480-481 (SW-29).

[42] Leggett, 1994, p.29.

[43] Unschuld, 2011, Vol I, p.188 (SW-10).

[44] Leggett, 1994, p.17.

[45] Leggett, 1994.

[46] The *Nei Jing* theory to explain numbness is described in SW-34, as follows "When the [constructive influence] is depleted, then this results in numbness. When the [defensive influence] is depleted, then this results in a loss of function. When both the [constructive and defensive influence] are depleted, then this results in numbness

together with a loss of function," (Unschuld, 2011, Vol I, p.531). It should be noted that "constructive influence" is sometimes regarded as being synonymous with "blood"; see p.174.

[47] SW-40 states "The disease is named blood decay. It is acquired in younger years either because of a massive loss of blood …. and the liver is harmed. Hence, the monthly affair is weak and diminished and fails to arrive," (Unschuld, 2011, Vol I, p.601).

[48] Leggett, 1994, p.28.

[49] Unschuld, 2011, Vol I, p.156 (SW-8).

[50] Ibid., p.372-376 (SW-21).

[51] Unschuld, 1986, p.347 (NJ-31).

[52] Maciocia, 1989, p.111; Cheng X, 1999, p.39. (It should be stated that in editions of my own book previous to June 2017, I also followed this tendency set by today's Chinese medicine textbooks—until I had thoroughly researched the *Nei Jing* and *Nan Jing*.)

[53] SW-43 associates "vomiting liquid" with illness in the pancreas (Unschuld, 2011, Vol I, p.643). LS-10 associates "food ingested will be thrown up again" along with "the stomach duct aches" with illness of the pancreas (Unschuld, 2016, p.183). It is notable that these signs and symptoms are associated with the panaceas. This is perhaps a result of the *Nei Jing* tendency to consider the stomach and pancreas jointly. However, it should be stated that the attribution of many of the signs and symptoms in this bullet list to the stomach, is a practice of today's Chinese medicine, informed by the knowledge of contemporary anatomy and physiology.

[54] SW-23 states "When the [influence] in the five [*yin* organs] have a disease…. In the stomach it causes [influence] to move contrary to its regular course, it causes hiccup," (Unschuld, 2011, Vol I, p.402).

Chapter 4

[1] SW-13 states "People in antiquity lived [simple lives]… Internally, they knew no entanglements resulting from sentimental attachments, externally, they did not have [the stresses of today]. In this peaceful and tranquil world [they did not get seriously ill]. The people of today are different. Anxiety and suffering encircle their interior…. Also, the people have lost the knowledge how to follow the four seasons… This is why minor diseases inevitably develop into serious problems" (Unschuld, 2011, Vol I, pp.219-223). And SW-14 states "If cravings and desires have no limits, if anxiety and suffering find no end, the essence [influence] will be destroyed, the [constructive influence (*ying chi*)] is impeded, and the [defensive influence (*wei chi*)] vanishes. Hence, the spirit leaves and the disease does not heal" (Unschuld, 2011, Vol I, p.238).

[2] NJ-16 associates "a tendency towards tidy appearance" and "an inclination to become angry" with liver "afflictions" (Unschuld, 1986, pp.219-220).

[3] LS-66 states "Rage harms the liver" (Unschuld, 2016, p.611).

[4] LS-47 associates the following states with a heart condition: "[people] suffer from vexation and tend to be forgetful. They have difficulties to open their heart and say something… They are made to fear by someone else's words" (Unschuld, 2016, p.450). And LS-34 associates the following with heart conditions: "The heart is vexed with closure and [the person is speechless]. Patients lower the head and silently withdraw" (Unschuld, 2016, p.369).

[5] SW-44 states "In case of a loss, or in case one longs for something but does not get it, then this manifests itself as [shortness of breath and noisy breathing; i.e. it weakens the lungs]" (Unschuld, 2011, Vol I, p.656).

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