

Early History:

The Development of Endocrinology in China and the Use of Bioidentical Hormones

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Oriental medicine is based on a wealth of information which has been recorded and passed down through the centuries, its wisdom still applicable in modern practice. As we contemplate using bio identical hormones (bht) today, it is interesting to see what the past has to offer on the subject. Recently I stumbled upon just such historical documentation and was surprised to find that bio-identical hormone replacement is not a stranger to Chinese medicine as I had thought.

As early as the 2nd century BC, the Chinese were experimenting with bioidentical hormones in their treatment of disease according to research done by Dr. Joseph Needham. Needham was a Cambridge scholar who did extensive research and writing about China. Born in 1900, Needham began his life studies in the field of microbiology. At Cambridge, friendships with visiting scholars from China inspired him to learn Chinese and he began studying the history of science in China, an endeavor which became his lifelong pursuit. In 1942 he was sent to China by the Royal Society and stayed through the 2nd World War as Scientific Counselor at the British Embassy in Chungking. During his stay, he undertook the enormous task of researching and documenting the history of scientific discoveries in China, a task which continues today with the Needham Foundation. The major work for which he is known, *Science and Civilization in China*, is an encyclopedia of thirteen or more huge volumes. His fifth volume, part 5, covers Taoist alchemy and is entitled Chemistry and Chemical Technology, Part 5: Spagyric Discovery and Invention: Physiological Alchemy. It is a fascinating read and the primary source for this article.

It was as a result of the Taoist quest for immortality that many unusual, for the time, ingredients and practices were researched and developed. Of course, the nature of life being what it is, the Taoists were divided on issues: what were proper techniques and methods for attaining immortality and whether it was proper to even seek immortality.

Two main divisions of Taoist thought existed: the wai tan and the nei tan. The wai tan group was concerned with developing and administering exterior substances which could prolong life and hopefully promote immortality. The wai tan were the ones who developed the chemistry used for extraction of mercury and other substances used in elixirs. The nei tan group totally rejected the practice of using any external substances and relied on ingredients found internally, recognizing and using biologically active substances found within the body, such as saliva, semen, the breath, placenta and so on.

Over time the wai tan group applied the technology they had developed, such as that used to extract mercury from cinnabar, in a series of quite sophisticated extrapolation processes, to the nei tan's bodily fluids, specifically urine. This development, according to Needham, was actually a joining of the two schools of thought, and resulted in the creation of a new substance for promoting longevity if not immortality. The extraction

process produced white crystals, called chhiu-shih, which translates as the autumn mineral.

In reading Needham's writings, it is clear that use of this medicinal was refined over many centuries with fastidious observation to details. The use of urine as medicine has a long history in many cultures but the extraction of substances from urine, specifically hormones, at this early date is unique to the Chinese. The Chinese considered urine to be a part of blood and as such contained properties of the blood. Thus, they concluded its value in treatment of disease. The types of urine used are specified: male or female, age and diet were all of concern.

Early references to chhiu shih appear in print from 125 BC, the time of Liu-An, reputed father of autumn mineral, Prince of Huai Nan. Here is an excerpt from the writings of Li Shih-Chen speaking of the origins of the term chhiu shih (autumn mineral):

The term was really first used by the Prince of Huai-Nan. (Liu-An) named one of his tan (elixirs) chhiu shih, to express its white color and its solidity. Recently people have purified the urinary precipitates (jen chung pai) to a white substance which is also called chhiu shih, to indicate that like the urine itself it is derived from the excess of the nutrient essentials of the vital forces (ching chhi). The iatro-chemists repeat the process of sublimation (sheng ta), and the best product is called chhiu ping. The idea (of the initial concentration) was derived from the evaporation of sea-water in the production of salt. Indeed there are adepts who place (certain) salts in a reaction-vessel and apply heat to obtain a substitute product. It is important to know the difference between the real product and the false one.¹

There are quite a number of recipes for the Autumn mineral included in this volume. They describe in detail a variety of techniques, however there are two main differentiations, one using heat to sublime, called yang lien and one using coolness or room temperature to precipitate, called yin lien. In their words, they were extracting the yin within yang and the yang within yin. By using specific temperatures the steroids remained stable and other inactive materials separated from them. Another recipe mentions the use of saponins to precipitate solids, a technique not utilized in Europe until the 1900's. The end result of the two different processes: they were able to extract two separate substances, gonadotropin or anterior pituitary hormones, and sex hormones, androgens and estrogens. Needham's knowledge as a microbiologist comes though in his analysis of these recipes and he explains in terms of modern chemistry what they were achieving in these concoctions. Recipes for autumn mineral appear in print from +1025 and on. They are fascinating to read, revealing the theories of yin and yang and five elements on which they are clearly based. The oldest written one (+1025) follows:

Collect ten tan (over 150 gallons) of male urine and set up a large evaporating pan in an empty room. Fix on top of it a deep earthenware still, luting the edges together with paper-pulp and lime so that when it has

dried no steam can escape. Fill the evaporating basin 70 to 80 percent full with urine, and heat strongly from below, setting a man to watch it. If it froths over, add small amounts of cold urine. It must not be allowed to overflow. The dry residue is jen chung pai. Put some of this, finely powdered, into a good earthenware jar and proceed according to the method of sealing and subliming by placing the whole in a stove and heating with charcoal. About two or three ounces (of sublimate) will be obtained. Grind this to a powder, and mix with date-flesh to make pills the size of a mung bean. For each dose take five to seven pills with warm wine or soup before breakfast.²

The autumn mineral was used for treating a wide range of conditions, much as we use bht today:

hypogonadism, impotence, sex reversals (where males spontaneously turned into females or vice versa, a phenomenon well known in ancient China), hermaphroditism, spermatorrhea, dysmenorrhea, leucorrhea, sexual debility, and even apparently stimulating the growth of the beard (since the Chinese knew that men grew beards as a result of having testicles and ceased to do so when castrated).³

Other discoveries in endocrinology in China include the use of thyroid hormone to treat thyroid disorders and the diagnosis and treatment of diabetes. By the 7th century AD, the Chinese were writing about the use of thyroid hormone to treat goiter. Chen Ch'uan was the first physician to describe the preparation and uses for thyroid. They were able to differentiate between goiter and thyroid tumor through palpation, goiter being a moveable mass and a tumor immovable. Western treatment of goiter with thyroid extract did not begin until 1890, over 1000 years later. The Chinese had knowledge of seaweed as a treatment for goiter much sooner than the West as well.

In the 7th century they had also arrived at a treatment protocol for diabetes much like ours today: avoid alcohol and starch. Diagnosis for diabetes included noting the sweetness of the urine. Li Hsuan wrote:

This disease is due to weakness of the renal and urinogenital system. In such cases the urine is always sweet. Many physicians do not recognize this symptom. The cereal foods of the farmers are the precursors of sweetness...the methods of making cakes and sweetmeats...mean that they all very soon turn to sweetness...It is the nature of the saline quality to be excrete. But since the renal and urigenital system at the reins is weak it cannot distil the nutrient essentials, so that all is excreted as urine. Therefore the sweetness in the urine comes forth, and the latter does not acquire its normal colour.⁴

The goal of Needham's research was to illuminate the true origins of many scientific discoveries which previously we have attributed to Western origins. In reading this text,

one can only marvel. We see that the timing between East and West discoveries in endocrinology is extremely different. The Chinese were a thousand years ahead of the West in identifying the sweetness of urine; it was not identified in Europe until 1660 by Thomas Willis. Goiter treatment in the West lagged over a thousand years behind the Chinese. And it wasn't until 1927 when S. Ascheim and B. Zondek announced the discovery of abundant sex hormones in the urine of pregnant women, over 2000 years after the Chinese.

¹ Needham J, Lu G-D, "Proto-endocrinology: Medieval Preparations of Urinary Steroid and Protein Hormones," *Science and Civilization in China*, Volume 5: Chemistry and Chemical Technology, Part 5: Spagyric Discovery and Invention; Physiological Alchemy, pp. 301-337, Cambridge, UK: Cambridge University Press, 1983.

² *ibid*, p.313

³ Temple, R, *The Genius of China*, p130

⁴ *ibid* (Needham), p.133

Also, my thanks to Dr. Jonathan Wright for bringing this information to my awareness.