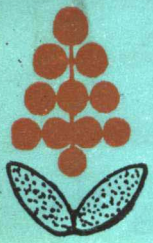
英汉对照

中药与健康长寿

TRADITIONAL CHINESE MATERIA MEDICA AND LONGEVITY

顾学裘　韩　阳　编著



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内 容 提 要

本书大部分篇幅介绍了我国近代在医药学中抗衰老中药研究的进展，包括延缓和防止生理衰老和治疗某些与衰老有关的疾病。用英文和中文两种文字，可供对照阅读。

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Introduction

Senescence is unavoidable in any life process but it is manageable. The comprehensive survey made so far tends to classify the phenomenon into two different categories.

The first is a natural or physical phenomenon, which refers to the retrogression of organs when old age is reached. In other words, it is the loss of adaptability to circumstances as one grows old. A Chinese proverb puts it well by saying "A muskmelon would fall off the stem in time when it is ripe", meaning that life process follows closely its normal course.

The other one is pathological in nature. This latter type refers to senescence due to illness such as heart failure, encephalo-or cardio-vascular diseases, cardiovascular-renal diseases, and cancer or other external factors. Sometimes it is difficult to draw a clear line between the two categories.

In China, the following age groups are generally accepted in geriatrics: 45-59 years old, early stage of senescence; 60-89 years old, advanced stage of senescence; 90 years old and above, gods of longevity. Our academic efforts of more than a decade have been to discover some ways for the sole purpose of prolonging human life.

Recently we have been concentrating our attention on DDS (Directed Delivery System), which in fact is a new dosage form for carrying drugs to a certain target. The drugs we used include such immunopotentiators as polysaccharides of Polyporus Umbellatus, Radix Ginseng, and Radix Astragali seu Hedysari. Also put into consideration was a traditional Chinese theory of strengthening the patient's resistance and dispelling the invading pathogenic factors, by using which theory a series of polyphase liposome called 139 were invented for the treatment of cancers and tuberculosis, hepatitis B, and vasculitis as well.

As the study of geriatrics develops the truthfulness of many conventional views comes under suspicion. People used to think that senility is proportional to one's age. However we could often see people over seventy still vigorous in contrast to the premature decrepitude of some people well under sixty. It is natural that when people have reached the age of forty changes would take place in the lung capacity, the thickness of bloodvessels, eyesight etc. However experts say the change is not drastic unless some other external factors exist. A western geriatric center demonstrated that when people reached old age, little or no change could be observed in one third so far as kidney functions were concerned. Some damage is caused by smoking, drinking, lack of physical exercise

or sudden change of living conditions. Loneliness, hot temperament and mental tension may sometimes be responsible for early death. Scientific investigation has shown that tension may affect blood pressure, heart rate and even resistance against diseases, and reduce immunity greatly. To prolong human life not only involves biological but also sociological factors. From the beginning of the century men have brought many infectious diseases under control, improved environment, and cut the death rate of infants so that the average life span has got prolonged. Once that more achievements are made in controling the four pests(heart failure, encephalo-or cardio-vascular diseases, cardiovascular-renal diseases, and cancer), to add another 10-20 years to the already prolonged life span will be possible.

China has a long history in procuring drugs against senescence and much experience has been gained through its work in this field. As early as in the Han dynasty "Shen Nong's Herbal" described altogether 365 materia medica, 120 out of which belonged in the category of brisk, life-prolonging, and five viscera strengthening nature. Another well known Chinese classic "Compendium of Materia Medica" collected 177 different kinds of similar drugs in it. In modern times work has been done focusing on two aspects; one is physical function strengthening, and the other is from the angle of pathology,

that is, to achieve results by curing diseases. Usually it is difficult to draw a clear line between the two aspects.

I. Dysfunction of Biosynthesis of Protein & Nucleic Acid

Along with the growing of age, DNA in human cells will die or cross-link, which fact is responsible for the dysfunction of biosynthesis of proteins and consequently no enzymes and hormones which are essential for normal metabolism will be produced. As a result cells are accelerated to fall into decay. It is rational to think that if only we could repair the damaged DNA molecules or prevent them from cross-linking, we would slow down the process of aging and rejuvenate the senile (1).

Experiments have shown that Radix Ginseng and its saponins can promote DNA, RNA, and protein synthesis, polysaccharide of Ganoderma Lucidum Seu Japonicum, D_6 can promote the synthesis of protein in liver and bone marrow cells, and Radix Notoginseng and its saponins can help the synthesis of protein in liver and serum, and DNA in the liver of mice and those with liver damage (2). Fructus Schisandrae, Rhizoma Atractylodis Macrocephalae, Radix Astragali seu Hedysari, Fructus Lycii, and Radix Acanthopanacis Senticosus possess the same action as Radix Ginseng. Cordyceps can increase the weight of the spleen and accelerate the replacement of

the old RNA and protein by the new in the spleen (3). Radix Astragali seu Hedysari and Fructus Ziziphi Jujubae can cause plasma proteins of undernourished patients to restore to the normal level (3). Radix Astragali seu Hedysari can also increase the permeability of ^{3}H leucine into the liver and hemocyanin (4), and the content of DNA in the regenerated liver (5).

It is just Radix Ginseng's action of strengthening the metabolism of proteins and nucleic acids and restoring the attenuated synthesizing and mending ability of proteins and nucleic acids back to the normal level that constitutes its tonic and invigorating nature.

Whether the nourishing action of vital essence by Cordyceps sinensis has anything to do with the metabolism of proteins and nucleic acids or not still remains to be proved. However, according to Zang Qi-zhong et al. Cordyceps sinensis and cultivated mycelia do increase the weight of the spleen and accelerate the replacement of the old nucleic acids and proteins by the new in the spleen (3). A possible explanation of the increase of RNA and the decrease of proteins in the spleen is that the acceleration of cell division and proliferation gives rise to the increased immunology and resistance against diseases and results in the nourishing effect. With Cordyceps scientific analysis of the results of the experiments offer solid grounds for the use of it by the traditional Chi-

nese doctors.

Ⅱ. Effects on Lipid-metabolism

Because of the dysfunction of lipid-metabolism, the aged tend to suffer from obesity or atherosclerosis. Radix Ginseng, Ganoderma Lucidum seu Japonicum, Radix Polygoni Multiflori etc., which possess the effect of reducing serum cholesterol are often used in the prevention of obesity and atherosclerosis of the aged people.

Edible mushrooms such as Xianggu mushroom, straw mushroom, dried mushroom (picked in winter) and tremella all contain polysaccharide, which is effective against cancer and the accumulation of cholesterol in blood plasma as well. In the late 60's some Japanese scientists separated successfully an alkaloid named eritadenine from the aquaeous extract of Xianggu mushroom. The mice fed on the dried powder of eritadenine mixed together with their feed for some time were found to be reduced in the amount of cholesterol in blood plasma (6-10).

The mechanism of the action of reducing cholesterol by eritadenine or the dried powder of Xianggu mushroom is as follows: a/ to inhibit the synthesis of cholesterol in the body, b/ to promote the dissolution of cholesterol, c/ to inhibit the absorption of cholesterol, d/ to promote

the excretion of cholesterol. The above theory is not only based on pharmacological experiments, examining carefully the faeces collected from the experimental group and control group of mice, and cholesterol content in their liver, blood, and body but also on tracting tests by using synthetic and radioactive cholesterol and eritadenine(11).

Ⅲ. Involution of Endocrine System with Age

E. Finch et al. pointed out that the system composed of hypothalamus and hypophysis was the main organ responsible for endocrine. As has been demonstrated by experiments as people grow old, changes towards aging would take place in the hypothalamus. In old people's hypothalamus and black substance there is just half dopamine synthetase as much as before. The amount of dopamine deminishes as people grow old. Clinical observation shows that the basic secretion of adrenal cortex by the aged people decreases by one fourth. 17-hydroxy-and 17-keto-steroid excreted by the aged in 24 hours in urine is less than that by the young. Dysfunction of adrenal cortex of the old people constitutes one of the reasons why they can't stand irritable stimuli. Many a report shows that Radix Ginseng (12-13), Radix Notoginseng, Radix Aconiti Praeparata, Radix

Polygoni Multiflori, and Radix Morindae Officinalis can obviously excite the function of adrenal cortex. Cortex Eucommiae can also exite hypophysis — adrenal cortex system (14). Radix Ginseng increases the secretion of adrenocortical hormone by mice, and at the same time cAMP content in the adrenal gland increases. In the case of old people cGMP also increases in blood plasma. Panaxoside from the fruit can do the same, which may be responsible for the regulation of the mechanism of Radix Ginseng in dual directions. This obviously contributes to the balance of organism. That cGMP plays a role in promoting immunocompetence and cell multiplication may be a special effect of panaxoside from the fruit on the aged. Panaxoside possesses anti-irritability action, and can very markedly prolong the life of irritated animals, and restore rapidly the function of adrenal cortex when it fails to work.

The so-called kidney-strengthening drugs such as Radix Ginseng, Cornu Cerri Pantotrichum, Radix Acanthopanacis Senticosi, and Herba Epimedii can stimulae sexual function just like gonadotropic hormone, so they are used to improve the degenerated sexual function of the aged. Kidney energy reinforcing drugs can make up the deficiency of the HCG/LH receptor function and put an end to the weight loss of the ovary of adrenal gland and thyroid-removed rats (15). "Bu Shen Fang",

a kidney energy-reinforcing recipe, (Radix Aconiti Praeparata, Rhizoma Rehmanniae Praeparatae, Seman Cuscutae, Radix Morindae Officinalis, Herba Cistanchis, Herba Epimedii, etc.) increases greatly the weight of anterior pituitary, ovary, and womb of the experimental group of rats over the control group (16)

Ⅳ. The Application of Drugs Strengthening The Body Resistance And Supporting The Healthy Energy

Doctors of traditional Chinese medicine uphold that drugs strengthening the body resistance and supporting the healthy energy can do a lot of good to the functional activities of the five viscera, and can be used in the treatment of quite a few diseases. Both pharmacological tests and clinical data show that drugs strengthening the body resistance and supporting the healthy energy do not direct their action to a certain individual link of a certain disease but to the adjustment of a certain general anti-disease mechanism. The maintenance of a balanced state of organism is a prerequisite for good health. In traditional Chinese medical theory, Zheng or Ben(vital energy)may mean to ease the extent to which the unbalanced state of organism has reached by strengthening the regulatory function of important

organs and/or by inhibiting the reaction of organisms to pathogenic factors. The pharmacological studies of Radix Ginseng and Radix Acanthopanacis Senticosi have demonstrated that they are influential in the metabolism of nucleic acids and proteins, which are all essential materials for life (17) (18).

Ganoderma Lucidum (Leyss ex Fr.) Karst. is one of the drugs strengthening the body resistance and supporting the healthy energy, and one of the best drugs against senescence. Its mechanism for action is many-sided. For example, D_6, a polysaccharide of Ganoderma Lucidum, separated from the seeds can increase the phagocytosis of the macrophagocyte in the mice's abdominal cavity (19). Guan Hong-chang et al. (20) studied the possible effects of D_6 on the synthesis of nucleic acids and proteins in the liver and marrow cells. Continuous administration of D_6 (74 mg/kg) was shown to promote ^{3}H-Leu incorporating into the proteins of serum and livers of mice. Meanwhile it also increased the content of cytochrome P-450 in liver homogenate. P-450 is an exutory whose exutory mechanism falls into two categories: first, the drug promotes the multiplication of liver cells; second, the drug either increases the synthesis of mRNA or slow down the degradation of mRNA. These reactions contribute to the regulation of the contents and activities of active substances in the body, and raise the

detoxic action of the liver. Thus Ganoderma Lucidum is considered to have liver protection and detoxication action (21-22). These actions tend to strengthen the defensive system and keep the balanced state of the organism. To sum up, D_6's regulation of cell metabolism through its influence on the metabolism of nucleic acids and proteins, should be considered as the chief mechanism responsible for strengthening the body resistance and supporting the healthy energy.

V. Promoting Immunocompetence To Strengthen The Resistance Against Diseases

By using modern theory, methodology, and technology of immunity to discover new Chinese herbal medicines which will promote immunocompetence and strengthen the body resistance against diseases, open up new possibility of developing new drugs against senescence. Most of the resistance-strengthening traditional Chinese medicines such as Radix Ginseng, Radix Acanthopanacis Senticosi, Radix Astragali seu Hedysari, Ganoderma Lucidum seu Japonicum, Fructus Lycii, Poria Cocos, etc. are more or less immunogenic. When applied to malignant cancer, the observation results of phagocytic rate and conversion rate of lymphocyte confirmed this.

Ginseng saponins help cancer patients increase the number of r-globulin and specific IgM, promote the production of antibody and the conversion of lymphocytes, reinforce the function of reticuloendothelial system, contribute to multiplication by increasing cGMP and decreasing cAMP in the bone marrow, and strengthen the non-specific body resistance by increasing cAMP of the adrenal cells. Clinically it is used in the treatment of leukopenia caused by chemotherapy and radiotherapy, and anti-serum allergic shock (23, 24, 25).

Wang Ben-xiang et al. (26) gave polysacchride of Radix Ginseng to mice (50, 200, and 400 mg/kg daily) and 24 hours after the third time of administration, polysaccharide of Radix Ginseng was found to have strengthened the phagocytosis of the reticuloendothelial system. Seven days later the content of specific antibody and IgG in the serum of mice immunized with cells from sheep was highly increased. And results from esterase staining demonstrated that polysaccharide of Radix Ginseng could increase the percentage of B cells. On the other hand, seven days' administration of polysaccharide of Radix Ginseng(500 mg/kg once, daily)to mice coulde also cause an obvious increase in the content of serum complement. In a word, polysaccharide of Radix Ginseng exercises a stimulant action on the immunity system either specific, non-specific, cellular, or humoral.