

Use of animal products in traditional Chinese medicine: environmental impact and health hazards

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SUMMARY. Traditional Chinese medicine (TCM) has been increasingly practised in many countries of the world. Some recent textbooks of TCM still recommend formulas containing various animal tissues such as tiger bones, antelope, buffalo or rhino horns, deer antlers, testicles and os penis of the dog, bear or snake bile. Usually, animal tissues are combined with medical herbs. In most of the cases, the medical use of the preparations is justified in terms of the rules of TCM. So far, little research has been done to prove the claimed clinical efficacy of TCM animal products. This paper discusses some related ecological, ethico-legal and health concerns such as hunting, breeding and trade with endangered species, risks of transmission of zoonoses, quality of the products, and alternatives to preparations from endangered species.

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INTRODUCTION

Traditional Chinese Medicine (TCM) has been increasingly practised in many countries of the world. Various forms of TCM have been advocated to treat numerous diseases and ailments in humans and animals. It is estimated that at least a quarter of the world's human population use medical practices based on TCM.¹

It is claimed that about 13% of the medicines used by TCM are derived from animals. Contrary to the case of medical herbs,^{2,3} the animal-based products and remedies have not been systematically studied. The clinical use of these preparations is often based on tradition and belief, rather than on evidence of efficacy.

The objective of this paper is to review some ecological, ethico-legal and health concerns related to the use of animal TCM products.

ECOLOGICAL PROBLEM

Rapidly growing human populations threaten the well-being and existence of many species of vertebrate animals. It has been estimated that approxima-

tely one in four mammalian species are at high risk of extinction.⁴ A similar gloomy situation has been described in the remaining classes of vertebrates including birds, reptiles, amphibians and fishes. Biologists agree that, on a worldwide basis, species are vanishing 100 times faster than before the arrival of *Homo sapiens*.⁴

This rapid deterioration of the natural biodiversity has many long-term ramifications, the consequences of which are progressively emerging. Experts believe that the consequences represent a severe threat to further human development.⁵ Loss and destruction of habitat, and excessive or uncontrolled hunting are among the main causes of the rapid extermination of numerous animal species. Medically speaking, the one major negative consequence of this trend is that there will be essentially less choice for the future development of medicines. At present, about 40% of all prescription drugs are substances originally extracted from plants, animals, fungi and microorganisms.⁴

Traditionally, numerous parts of animals have been said to have medicinal properties. For instance, some Asian cultures imbue tiger with enormous healing qualities, and use various tiger parts—especially bone, but also hair, teeth, skin and many other parts—as a cure for dozens of ailments.⁶ In China,

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tiger bones have long been used in the treatment of a variety of diseases, including hemiplegia and joint sprains. Tiger urine was said to be a sovereign remedy for rheumatism.⁷

Since the seventh century, bear gallbladder has been prescribed in TCM to treat a range of maladies including inflammation, bacterial infections and pain. The active ingredient in bear bile, ursodeoxycholic acid, has recently been described and successfully synthesized.⁸

Rhino horn has been used as an ingredient in traditional Asian medicine for the past 2000 years. Virtually every part of the rhino is used: the horn for alleviating fever, the skin for treating skin disease, the penis as an aphrodisiac, the bone to treat bone disorders, and the blood “as a tonic for women who are suffering from menstrual problems.” Asian rhino horns are more highly prized than African rhino horns; consumers believe that their smaller size means that they are more concentrated, and therefore more potent.⁹ Indeed, rhino horn is also claimed to be a potent remedy for male impotence. However, chemical analysis did not reveal any active ingredients to suggest that the remedy could be effective to treat the condition.¹⁰

Even some less spectacular animals are used in TCM. The skin, maw and bladder of the endangered Giant Salamander are used in numerous remedies in China.⁷ There is a recent upsurge of interest in using shark cartilage for the treatment of arthritis and cancer,¹¹ while seahorse is highly regarded as a TCM remedy for a variety of ailments ranging from asthma, sexual dysfunction such as impotence, to lethargy and pain.¹²

Some recent, internationally published textbooks of TCM still recommend the medical use of animal products. Maciocia¹³ described TCM herbal formulas containing tiger bones, horns of rhino, antelopes, cattle and goats, bovine calculi, antlers of various deer species, testicles and penis of the dog and parts of the reptile species Gecko. Chinese authors Xie and Liao¹⁴ recommend a few herbal formulas containing spinal cord of swine, rhinoceros horn, and antler and tortoise-plastron glue. The book has been designed as an academic introduction to the theory and practice of TCM for Chinese and overseas medical practitioners. Injection of a placental solution (of unspecified origin) into selected acupuncture points has been recommended in a textbook for Chinese medical students.¹⁵ The medical use of the above products is described primarily in terms of TCM symptomatology (Yin and Yang, Excess and Deficiency, Five Element Theory, etc.), and no scientific justification is provided in any of the above quoted medical texts.

Unfortunately, little research has been done so far to prove the claimed clinical efficacy of TCM animal products. Rhino horn, a mixture of various species of snakes and insect, and buffalo horn were used, together with medical plants, to treat mouth and tongue dryness, rheumatoid arthritis, as well as

redness and pain in extremities.¹⁶ In veterinary TCM, a recent publication suggests the use of a patent remedy including snake bile and several herbs to treat chronic bronchitis and emphysema.¹⁷ Bovine calculi mixed with various herbs were recommended for the treatment of canine distemper, meningitis, heat stroke and epilepsy.¹⁸ The studies are insufficiently documented to make any conclusions about the validity of the TCM statements.

Many animals have been hunted in order to satisfy the needs of the fast growing trade of TCM. As most of this hunting and trading is illegal, it is difficult to estimate the real contribution of the market to the species decline. Rampant poaching, spurred by the Oriental medicine trade, is listed as one of four main factors threatening the survival of healthy wild tiger populations. Continued demand for tiger bones makes hunting a greater threat than habitat loss, and only fragmented populations are resisting the pressure in a few natural sanctuaries at the dawn of the new millennium.⁶ The demand created by the fast growing TCM trade is a major cause of the overexploitation of the wild population of numerous animal species.¹

Each species plays its irreplaceable role in the fine network of relationships of nature. Disappearance of any species of living organism represents a dire loss for future generations of humankind. It is estimated that only a minute fraction of the species or organisms—probably less than 1%—has been examined for natural products that might serve as medicines. Many potentially life-saving drugs have been lost this way, even before being discovered.⁴ Additionally, it will be a sad world in which to live if children will only be able to see many animals in museums and in books.

ETHICAL AND LEGAL ISSUES

Many animal species used in TCM are listed by the Convention on International Trade in Endangered Species (CITES) of Wild Animals and Plants.¹⁹ Consequently, it is illegal to trade in these animals and their products in all member countries. This would automatically exclude medicinal use of any products originating from rhino and tiger, among other species.

Nevertheless, it is a sad reality that this law reinforcement has so far done little to save certain species. For instance, a place on Appendix I of CITES has done little to help the black rhino. It has simply driven a thriving trade in rhino horn underground, and the African rhino population has crashed from 65,000 in the late 1960s to less than 3500 today.⁹ Between 1970 and 1987, 85% of the world's rhinoceros population was killed. The cause: demand for rhino products in traditional Eastern medicine and demand for knife handles (made from the horn) used to make “coming-of-age” daggers for young Yemeni males. Several countries that are

CITES members continue to trade in rhino products (particularly rhino horn), and CITES' ability to legislate domestic enforcement mechanisms is non-existent.⁹

The use of animal medicines has been severely limited by the laws of many countries. For instance, Taiwan and the People's Republic of China have implemented their own laws banning the sale of medicines made from tiger bone and rhino horn.²⁰ In the UK, only plant materials can be used in herbal medicines. The forthcoming herbal medicine legislation in the European Union will not allow any non-plant materials.²¹

It is widely agreed among researchers and clinicians that the physiology, and the actual sensory and emotional experience of pain and suffering, are similar in man and animals. Naturally, pain and any other forms of suffering in animals should be prevented and treated whenever possible.²² These considerations should be relevant worldwide, although the local cultural context should be carefully considered.

It is possible that many practitioners of TCM are not fully aware of the fact that the majority of animal medicinal preparations are obtained under uncontrolled or otherwise suspect circumstances. For instance, bear's gall bladder (Xiong Dan), still used in TCM, is being extracted from bears kept on special farms. About 9000 bears are reported to be kept on 167 farms across China in excessively cruel conditions.²³ Additionally, the extraction of the bile (whether from a bear or a snake) requires opening of the abdominal cavity. This is a surgical procedure, which should only be performed by a registered veterinary surgeon knowledgeable in the relevant surgical and anesthetic techniques, as well as in the management of potential complications (such as post-surgical infection). There is doubt whether these medico-legal and humanitarian considerations are being fulfilled in those establishments. There is mounting international pressure to terminate the bear farming in China.²³

HEALTH CONCERNS

It is a well-recognized fact that numerous infectious diseases can be transmitted from animals to humans (i.e. zoonoses). In the context of TCM, the possibility of transmission from animal preparations to the patient should be seriously considered. According to a recent review,²⁴ numerous species of primates (monkeys and apes) are under imminent threat of extinction. Several species, such as the very rare Delacour's Langur from Vietnam, have become a favorite target of hunters because its bones, organs and tissues are used in traditional medicine. Indeed, numerous species of animals are hunted (poached) rather for their meat than for their supposed medical use.¹⁹ Nevertheless, there is often an overlap between the two purposes, and transmission of disease can occur in both instances.

It is appropriate to remark that several species of monkey have been identified as harboring infectious diseases transmissible to man with potentially grave consequences. The related risks can be illustrated by a recent case from a Safari Park in Great Britain, where a colony of otherwise clinically healthy Macaque monkeys had to be humanely destroyed once it had been discovered that the monkeys harbored the simian herpes B virus, known as Ebola virus in humans.²⁵ While the agent is not harmful to monkeys, it causes mortality in 80% of affected humans. Certain researchers seriously consider the hypothesis that the worldwide epidemic of the HIV virus (causing the AIDS infection in humans) might have been initiated by transmission of a virus from monkeys several decades earlier.²⁶

We are only progressively collecting the relevant information about the incidence, pathogenesis and transmission of infectious diseases from wild animals to humans. In the meantime, any unnecessary handling of living wild animals and their tissues should be limited to strictly controlled and justified situations.

Organs and various tissues including bones and bile can be a source of Salmonella infection causing chronic diarrhoea and endotoxic shock. The possibility of transmission of other serious and widespread zoonoses such as tuberculosis or rabies should be considered whenever animal tissues from unknown sources are handled and used as remedies.²⁷ The data on the incidence of the transmission in the above-discussed species used in TCM are not available.

The possibility of toxic or allergic reactions to animal products should also be considered, especially in the case of the parenteral (injectable) use of the remedies.¹⁵

SOLUTIONS

The above short review suggests that there are several urgent issues surrounding the use of animal products in TCM. The following suggestions are put forward in an effort to promote safe and sound guidelines for the medical use of TCM animal preparations.

Therapeutic alternatives

Whenever possible, practitioners of TCM should strive to replace medicines from endangered species with herbal or chemical remedies, or with products from domestic animals. For instance, rhino horn is still occasionally prescribed to treat male impotence. Hopefully, the recently introduced drug sildenafil will soon replace this illegal practice. Bear bile is still used in China to alleviate symptoms associated with overconsumption of alcohol.⁸ However, bear bile can be replaced with pig bile,²⁸ and additionally as many as 54 herbal Asian remedies can be substituted for bear bile.²⁹ Glycosaminoglycans and

chondroitine have been suggested to be the main therapeutic components of shark cartilage, which might thus be easily replaced by cartilage collected from slaughtered domestic animals, or by synthetic analogues.¹¹

Not only are these alternative preparations readily available without threatening the existence of the unique animal species, but also they are usually better tested for their efficacy and safety. It is extremely difficult to draw any firm conclusions about the efficacy of the vast majority of animal products recommended by resources of TCM, as they are usually administered as part of a complex remedy,^{13,14,30} and scientific studies are usually not available.

Source of the preparations and the quality control

TCM practitioners should never purchase preparations containing tissues of animals protected by law. Consequently, any use of products containing rhino horn, tiger or monkey bones, etc. must be considered as unlawful and unethical. The core value of medicine is to treat disease, and prevent pain and suffering. With respect to this, the practitioners should categorically refuse the use of remedies obtained from poorly or otherwise unprofessionally handled animals (bear's bile; animals obtained from street vendors, etc.).

A recent study of 260 Chinese patent medicines imported to the USA discovered that almost half contained potentially harmful levels of contaminants, such as heavy metals (lead, arsenic, mercury), drugs (ephedrine, salicylates, caffeine, phenacetin, etc.) and other potentially harmful chemicals. It was recommended that only medicines prepared under the Good Manufacturing Practice (GMP) should be used in that country.³¹ Indeed, unless the process of collection, manufacturing and distribution is supervised, there will be an open window of opportunity for falsification and poor quality of the preparations.

Medical information about the products

The use of certain animal remedies was justifiable in the past when no other therapeutic alternatives were available, when the particular species were plentiful in their natural habitat, and when the extent of the trade was only limited. This traditional approach is no longer sustainable in our modern, globalized and technically advanced world. These days, other approved therapeutic approaches are available, making little room for the medicinal use of endangered species of animals. The concerned practitioners, teachers and researchers of TCM should reflect this changing attitude when sharing their valuable insight and knowledge with their fellow-workers, or to the lay public. The description of medicinal use of animal products in the professional and lay literature

should be strictly limited to the very few legally and ethically justified cases. Historical quotations should be put into proper context.

CONCLUSIONS

There are numerous reasons to urgently re-think the medicinal use of animal products in TCM in humans and animals. In doing this, we should particularly take into account the rarity of the species, the unnecessary suffering involved in the process, and the possible health risks linked to the administration of the products. The objective in this regard should be the use of medical preparations and techniques which are safe and beneficial to our patients. Any medicine, including TCM, should be environment-friendly and ethically sound, and practised within the limits of national and international law.

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