

Sustainable veterinary medicine for the new era

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Summary

Sustainability aims to harmonise life on Earth without compromising the essential natural resources that should be the birthright of future generations. 'Sustainable medicine' (SM) is just one component of the wide range of possible sustainable approaches to peaceful co-existence. Sustainable medicine envisions an uncomplicated system of maintaining the health of people and animals, both now and for many years to come. This type of medicine is based on ancient wisdom, knowledge and healing arts, combined with the advantages and technical achievements of modern science and other areas of medicine; it is an integrated approach to preventive, safe and affordable healing.

The term sustainable medicine also implies that the main therapeutic materials used in the course of practising this type of medicine can be replaced or replenished with minimal environmental damage after harvesting. The aim of sustainable medicine is to maintain the balance of nature, allowing an estimated 7 to 100 million species of life forms to co-exist and reproduce, and to sustain the long-term future of this planet.

The world is in the midst of an environmental crisis: anthropogenic environmental damage in the last century was greater than in any previous century. One of the major concerns is the misuse of medicines, and the resulting immune depletion in people and animals. Many traditional medical systems have taught that appropriate adaptation by, and of, an effective defence system is the key to health and survival. This is only possible if priority is given to a preventive rather than a curative approach to health care; the very same approach that is advocated by proponents of SM: an approach based on proper diagnosis and the use of personalised, tailor-made medicine.

The authors propose SM (the combination of the advantages of modern, traditional and complementary medical systems) as the best approach to providing better health care services for people and animals. The article presents a brief history of traditional medicines and outlines strategies for developing SM. The authors highlight some important factors in the development of SM in animal health care and attempt to encourage veterinarians to adopt a sustainable approach to treating animals.

Keywords

Acupuncture – Alternative – Complementary – Conventional – Environment – Herbal – Sustainability – Traditional – Veterinary medicine.

Introduction

Animal and veterinary sciences are changing rapidly. Many new diagnostic techniques and therapies have been developed in the last few decades. In the search for better results, scientific advances – from genomic levels to simultaneous consideration of their multiple interacting factors - have helped diagnostic investigation. The need to cope with the complications of newer diseases and emerging complex pathological conditions remains the main driving force behind diagnostic progress at molecular level and in gene therapy. Science has tried to use available knowledge and resources to develop animal production so that it is capable of meeting human needs. However, newer host-shifting diseases like Severe Acute Respiratory Syndrome (27) have highlighted the knowledge-gap and the practical difficulties in combating rapidly mutating pathogens.

Conventional science has been misused and has failed many times; the attempts of conventional science to prevent and treat many common diseases, especially chronic diseases, have been almost futile. Public and health professionals realise this, and they also know that, to a large extent, science has been hijacked by political, military and commercial interests. These power-groups have little interest in an effective health system, one which is based on affordable methods of disease-prevention for all people and their animals. Therefore, the public has started to reject the attempts by conventional science, its proponents, and those with vested interests, to control and dominate the choice of treatment options (8, 13). Consequently, public demand for the ancient arts of healing has increased markedly, as has the number of people seeking professional training in these areas.

Complementary and alternative medicine (CAM) is the best term to describe a new modality that lies outside, or beside, conventional medicine. More recently, the terms holistic medicine, or complementary and integrative medicine, have been used. These terms indicate that these other methods are used in addition to conventional therapies. Complementary and alternative medicine includes acupuncture (AP), acupunctuery, chiropractic and physical therapy, massage therapy, homeopathy, botanical medicine and nutraceutical medicine. Holistic medicine is the integration of conventional medicine with some or all of the CAM modalities.

As CAM gains acceptance in human medicine, veterinary professionals are beginning to look at how complementary and alternative treatments could be incorporated into veterinary medicine. In 1996, the American Veterinary Medical Association (AVMA) revised the guidelines for the use of CAM in veterinary medicine. These guidelines reflect the current status of the role of these emerging modalities within the parameters of veterinary medicine. The AVMA agreed that sufficient clinical and anecdotal evidence exists to suggest that

there are real benefits from some unconventional approaches. The AVMA accepted veterinary acupuncture (VAP) – in their words ‘use of needles’ – as an integral part of veterinary medicine. The shifting attitudes of animal owners to complementary and alternative veterinary medicine (CAVM) and the global acceptance of the use of this type of medicine in providing a comprehensive approach to animal health care are encouraging. Pressure is growing to incorporate CAM into mainstream medicine (2, 8).

A large subset of CAM includes traditional medicine (TM) or natural therapies that are cultural or ethnic in origin. These include nutritional, herbal and manual therapies.

Conventional medicine (‘western medicine’ [WM], ‘scientific medicine’ or ‘modern medicine’), was popular in the past because of clinical success in treating many acute diseases, especially those that required intensive care or rapid suppression of symptoms. Colonised indigenous peoples called such medicine ‘the white man’s pill’; WM won their confidence because it gave them instant relief from the effects of malaria and other infections that were less responsive to traditional methods. Other undisputed successes for WM included safe anaesthetics for surgery, sedatives and psychotropic drugs for acute mental states, potent analgesics for severe pain, antibiotics for life-threatening bacterial infections, and steroids for acute inflammation. There was no turning back after that. Driven by commercial interests and the need to produce more and cheaper food, the era of intensive animal production followed inexorably (2, 26). That system is based on routine heavy inputs of vaccines, antibiotics, anthelmintics, pesticides, agrochemicals and artificial fertilisers.

In this text, the authors describe an approach that integrates the best of both conventional and traditional medicine; an approach that is often termed ‘sustainable medicine’ (SM). The authors wish to introduce veterinarians to the philosophy, scientific basis, clinical applications and development of SM. The broad scope of their training equips veterinarians to understand the delicate balance of nature, and to appreciate the human-animal relationship and the need for harmony with nature. Veterinarians who increase their knowledge by studying the principles of SM and incorporating them into their day-to-day practice will enhance their clinical success rates, improve animal health and well-being, and play an important role in reducing environmental damage.

Sustainable medicine

Sustainable development is an idealistic concept, which originated from ‘Our Common Future’, the 1987 report by the United Nations World Commission on Environmental Development. The term ‘sustainability’ has been interpreted in different ways, but the popular and appropriate definition is

'meeting the needs of the present without compromising the ability of future generations to meet their own needs'. Thus, sustainable development is a process of redirection, reorientation and reallocation. It is a fundamental redesign of economic, technological and sociological processes; a redesign with the aim of affecting change which will ensure a better future for all. Sustainable medicine is a new approach to practising medicine, one that meets not only our current needs but will also meet the needs of succeeding generations.

The concept of SM derives from the concept of sustainable agriculture (SA), which has been practised for several decades. One definition of SA is agriculture which balances concern for environmental soundness with economic viability and social justice among all sectors of society (1). Sustainable medicine is a system that aims to maintain the health and well-being of people and animals well into the distant future. Sustainable medicine defines sustainability in terms of resource availability and functional integrity, i.e., retaining the capacity of each of the component parts to function normally (20). The concept of sustainable medicine fits well into the vision of the Food and Agriculture Organization of the United Nations (FAO), which defines sustainable development as 'the management and conservation of the natural resource base, and the orientation of technologies and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations'. The SM approach is a holistic approach, which aims to attain better treatment results that will eventually minimise or exclude further complications. It is likely that SM will eventually integrate the best of WM, TM and CAM so as to provide affordable and better care for people and animals. Sustainable medicine could rightly be called a 'medicine of love' because its core philosophy revolves around an approach based on love, respect and wisdom. By extending the principle beyond the patient to the global environment, the ethical core of SM extends the Hippocratic principle of '*Primum, non nocere* – First, do no harm'.

We are in an ironic position in the new millennium. Because our sense of 'chemophobia' is increasing, we are demanding the right to better product information (2, 12, 23, 24, 28) and a more natural system of animal production based on ethical animal husbandry and welfare. On the other hand, there is an urgent need to provide basic resources to meet the food demand of an ever-increasing population (9). It is the task of SM to deliver solutions which are suitable for both these situations.

The concept of sustainable medicine for animals challenges the misconception that animals are mere commodities, conglomerates of chemicals to be exploited. Developed nations, particularly the European Union (EU) States, are under increasing pressure to motivate farming communities to adopt more humane approaches to animal production (9, 13). In contrast, many poorer nations are losing the religious and

cultural heritage that taught the need give due respect to animals. Most complications of WM stem from the misuse of drugs, especially their widespread use with little or no rational justification (1, 6, 11, 18, 26, 38, 42). Some, especially those with commercially vested interests, argue for mass-medication in intensive animal production units. However, governments should carefully assess the cost-benefits (and collateral damage) of such policies.

Though SM is applicable in all countries, the approach is particularly beneficial in poorer communities and nations where a few animals represent the total wealth of a family (9, 10). The effectiveness of SM is already beginning to be recognised and there is greater international acceptance of holistic approaches in veterinary medicine. Such approaches include traditional Chinese medicine (TCM), which is one of the most natural and sustainable systems of medicine that there is, and one which has been practised in the People's Republic of China and in Chinese settlements for several millennia. Traditional Chinese medicine includes herbal medicine (HM) (19, 20, 28, 43), medicine of animal and insect origin (14, 33), physical medicine (AP, moxibustion, massage, etc.) and mental therapy (Qigong, meditation, etc.) (15, 23, 28).

The increasing incorporation of TCM into medical and veterinary practice signals changing attitudes to SM. The *Nei-ching* (the classic text on internal medicine, 221 BC-220 AD) is the oldest existing medical book in the People's Republic of China. It is a seminal text on TCM, attributed to the legendary Yellow Emperor, Huangdi. The underlying philosophy of the text is: 'Superior doctors do not treat disease... they prevent it'. This indicates the importance in TCM of trying to prevent disease, rather than waiting to cure it (19, 28). From the viewpoint of the *Nei-ching*, SM is a preventive medical system, based on effective, safe, readily available, inexpensive and renewable natural products. The need for good clinical medicine still remains because modern circumstances do not permit sole reliance on preventive medicine (8, 15, 28, 31, 36, 37). The authors propose SM as the best way to address the shortcomings of existing medical approaches. Sustainable medicine combines the advantages of WM, TCM and CAM to provide better health care for people and animals by doctors and veterinarians in the 21st Century.

Appendix 1 discusses strategies for developing SM, including the following:

- a) strategies to merge traditional Chinese veterinary medicine (TCVM) and modern veterinary medicine
- b) the role of personal effort in advocating SM
- c) the role of societies and organisations in promoting SM
- d) co-operation between TCM and TCVM
- e) university training and research
- f) government and private support.

The role of traditional medicine

All great civilisations (African, Amerind, Arabian, Chinese, Egyptian, European, Indian, Japanese, Lapp, Sumerian, Tibetan etc.) evolved their own forms of TM. These unique practices were developed by indigenous peoples by centuries of trial and error. Though the approach differed between cultures, all of them had one thing in common: they recognised nature as a supreme force; they observed the natural cycles and they knew the importance of living in harmony with nature. Until the early 20th Century, TMs were the only systems of medicine that were practicable for most people and their animals. Even today, in many communities, TM still constitutes the sole approach to medicine. Traditional medicine provides many cheap, safe and effective remedies for people and animals; its integration with the best of WM would inevitably improve clinical result (8).

Some people say that TM is unsustainable, or accuse it of promoting ignorance and superstition and of being a major factor in the extinction of certain plant and animal species (25, 32). However, rather than TM *per se*, it was human carelessness and greed that caused such extinction. Paul Ehrlich, a Stanford University ecologist, stated that habitat destruction – the inevitable result of expanding human population and human activity – is the main cause of extinction. In the 20th Century, in the name of progress, man-made environmental destruction has been catastrophic. A major mission for the 21st Century is to preserve our natural resources and human heritage as much as possible. Traditional medicine is an important part of human heritage and any attempt to completely replace it with WM will devastate the environment further and will only increase the misery and suffering of the world's poor. However, to achieve maximum long-term benefits, TM needs to be studied, verified and integrated with existing systems.

Though every TM system has its strengths and weaknesses, TCM is the oldest, most complete and most well documented system around, and the one which has achieved the most widespread recognition. Traditional Chinese medicine is a natural medicine, based on experiences gained over thousands of years and on the ideas of harmony, balance and change. Chinese herbal medicine (CHM) and AP are important parts of TCM. They help the normal adaptive and defensive functions of the body to confer therapeutic and prophylactic effects to other areas of the body which may be suffering from functional and organic diseases. The guiding philosophy of TCM is that all living creatures need to be in harmony with their environment. They need a balance of hot and cold, work and play, wakefulness and sleep, laughter and tears, etc. All the methods in TCM (herbs, AP, moxa, massage, exercises, etc.) aim to induce a change from the undesired to the desired situation, thereby restoring balance and harmony. The effects of TCM are transmitted via the natural adaptive responses of the body. Because of its natural philosophy, its ancient reputation and its excellent clinical success, TCM has gained international

attention. It is highly respected not only in poor countries, but also in wealthy societies, such as Japan, Korea, and the industrialised parts of Southeast Asia, Northern Europe, North America and Oceania.

Yi-Ching (*The book of changes*), circa 1000 BC, is a treatise of ancient Chinese philosophy. It defines the following two categories of change:

- a) no change, which means that the principle or activity must be maintained
- b) change, which means that the principle or activity may be changed or adjusted, depending on the situation.

The development of veterinary medicine by integrating traditional and modern concepts should be a combination of these two approaches: change and no change. Traditional Chinese medicine is the most obvious partner for WM to help establish SM for animals. There are thousands of experts devoted to preserving, developing, integrating and teaching TCM. Many nations and some commercial companies have started to invest in TCM research. For these and many other reasons, TCM offers the greatest prospect for integrating traditional and modern systems of medicine. The Indian subcontinent contributes much in the field of Ayurvedic HM. German investment to develop homeopathy is also praiseworthy. There are many other examples of combined and independent strategies to develop different components of TM. Sustainable medicine aims to integrate the best of TM with the best of WM to establish treatments of optimum safety and efficacy.

Traditional Chinese veterinary medicine

Traditional Chinese veterinary medicine (TCVM) includes CHM and AP; it dates back to the era of the Three Emperors, approximately 10,000 years ago. According to Chinese legend, Emperor Fusi founded animal husbandry and veterinary medicine, taught fishing and the art of domesticating animals, and brought civilisation to the primitive society that existed in China at that time. As agriculture was the main occupation, animals were important in Chinese society. As civilisation spread and flourished, Chinese peoples were constantly at war. Horses were especially important for military purposes. The need to care for animals, and horses especially, contributed to the development of TCVM. The armies needed animal doctors, who initially used the more developed ideas of human medicine. However, over time, TCVM progressed and the experiences gained were recorded. These records became sources of information for later generations.

Chinese herbal medicine is a phytotherapy, with a strong therapeutic reputation in the East. Plants, long known to have therapeutic (and poisonous) effects, have been used as medicines for millennia. Today, about 75% of the earth's population rely for their basic health needs on plants, plant extracts, and other tools of TM.

Chinese herbal medicine uses a complex combination of medicinal plants and other natural products, including extracts from living or dead tissue (animal, reptile, insect, venom, shell, coral, etc.) and minerals (mineral salts, certain types of pulverised rocks and soils, etc.). Chinese herbal medicine uses TCM theory and a TCM diagnosis of the pathological condition of the patient. The *Nei-ching* contains the basic theories and clinical uses of HM and AP for humans. It discusses the theory of Yin/Yang (passive and active), Xu-Wing (Five Phases, or Elements), Qi-Xue (vital energy and blood), Zang-fu (solid organs and hollow organs), AP points, aetiology, diagnostic methods, and the differentiation of disease syndromes. Many treatises on HM and AP follow the *Nei-ching* (19, 20).

Acupuncture literally means needle (*acus*) puncture, but it also includes moxibustion, a type of point cautery. The first written report of VAP may be from the West Zhou dynasty (1111-771 BC). This report referred to jugular phlebotomy to treat some febrile diseases of horses. During the Qin and Han dynasties (221 BC-220 AD), medical science flourished as communication became more efficient. Sun Yang, a veterinarian in the Qin dynasty, published the first book on VAP. Many veterinary books followed in the next centuries. The most famous was *Yuan Heng Liao Ma Ji* (a treatise on horses, by Yu Ben-Yuan and Yu Ben-Heng in 1608 AD). This book describes procedures for use in horses, cattle and camels. The influx of western ideas into the People's Republic of China in the 19th and early 20th Century demolished much traditional Chinese culture and science; concepts of WM almost made TCM extinct. However, in the past thirty years, there has been renewed interest in the techniques of TCM. In the People's Republic of China and elsewhere, research and development into TCM in humans and animals have become popular again.

Science and traditional Chinese medicine

The main constraints against the wider international acceptance of TCM are as follows:

- a) TCM is perceived as a threat to the multi-trillion dollar industry that is WM (6), its hospitals and related services
- b) there is a lack of scientific validation because of an insufficient amount of high-quality controlled research (23, 36).

The problems of validating TCM are similar to those of other clinical modalities that use highly personalised treatments.

In western 'evidence-based medicine', the most respected way to test the safety and efficacy of a drug is to use double-blinded randomised controlled trials (DB-RCTs) of a small number of (usually two to four) standardised treatments. In contrast to WM, it is almost impossible to design and run meaningful DB-RCTs for the highly personalised treatments that TCM uses. Other factors compound the difficulty of testing TCM by standards acceptable in WM. These include the fact that TCM uses a very close doctor-patient interaction: the doctor's *Yi* (focused intention), positive reinforcement, and advice on lifestyle, dietary, mental, physical and environmental adaptation. The main constraint in validating TCM, however, is inadequate funding for the large-scale trials needed to study the effects of personalised treatments in a statistically meaningful way.

Because of these constraints, it has often been impossible to conduct TCM research that satisfies the exacting standards of WM. However, many high-quality scientific trials have been reported recently. The following section summarises some of the results obtained by the authors and reviews relevant research by other workers.

Clinical and experimental acupuncture

Acupuncture and moxibustion (Chen-chiu [Zhen-jiu] – Needle and Fire) are specialised types of physiotherapy derived from TCM. They stimulate specific points or zones of the body to obtain a therapeutic or analgesic effect. Used properly, AP is very safe.

Control of pain, shock, collapse, treatment of alcohol and narcotic addiction and induction of surgical analgesia in humans and animals are the best known uses of AP. Few people know that AP is effective in a much wider variety of human and animal diseases. Some therapeutic effects of AP have been studied experimentally in animals and humans. Experimentally, many factors negate the effects of AP. These include: local anaesthesia of the points, nerve section, nerve block, spinal block, experimental lesions of the midbrain, or use of opiate antagonists or other receptor-activating or blocking-drugs. Other chemicals enhance AP effects, for example, diphenylalanine (a serotonin precursor), L-tryptophan and domosedan. This suggests that AP is a physical therapy, operating via reflex neural (peripheral, spinal, central, autonomic), neuroendocrine and endocrine pathways that activate homeostatic, adaptive and defence systems of the body.

Published research has confirmed that AP activates the body's defence systems. It influences specific and non-specific cellular

– and humoral – immunity. It activates cell division, including that of blood cells, reticuloendothelial cells and traumatised cells. It activates leucocytosis, microbicidal activity, antibodies, globulin, complement and interferon. It modulates hypothalamic-pituitary control of the autonomic and neuroendocrine systems, microcirculation, response of smooth and striated muscle and local and general thermoregulation. The effects of AP in stimulating the body's defence systems are involved directly in its therapeutic effects. Applications of AP include inflammation, trauma, tissue healing, burns, ulcers, indolent wounds, ischaemia, necrosis, gangrene, infections, post-infection sequels, fever, autoimmune disease, allergy, anaphylaxis and shock. Acupuncture treats or prevents the side effects of, or sequels to, cerebrovascular disease, coronary heart disease, general anaesthetics, parturition, surgery, cytotoxic chemotherapy and ionising radiation. It has widespread applications in clinical disorders of the respiratory, cardiovascular, digestive, gastrointestinal, urogenital, musculoskeletal and cutaneous systems. Because of the effects on the immune system, AP may inhibit neoplastic cells and can be a useful CAM therapy in acquired immunodeficiency syndrome (AIDS).

Acupuncture at acupoint GV26 (Ren Zhong, Man Middle, located in the midline, in the philtrum, between the nostrils (15)) can resuscitate humans and animals in shock or collapse. In acute emergencies, the needle is inserted 0.5 cm to 1.0 cm deep, and stimulated strongly. Acupuncture is used widely to treat spinal pain and/or paralysis in cervical – and thoracolumbar – disc disease in dogs. Many affected animals that had failed to respond to WM recovered after AP treatment. The AP effect involves the autonomic and peripheral nervous system and improves local circulation and muscle function. Acupuncture is commonly used to treat reproductive disorders (including anoestrus and cystic ovaries), dystocia, prolapsed uterus and retained placenta in sows, cows, bitches and mares. A needle implanted at Pi-Kao (between the nostrils) can end broodiness in domestic hens. The effect occurred in 2 ± 1.8 days, compared with 14 ± 9.2 days in controls and 14 ± 9.8 days in hens treated with clomiphen citrate (a hormone treatment) (21).

Acupuncture stimulation of points historically associated with reproduction altered blood levels of luteinising hormone (LH), follicle-stimulating hormone, oestradiol and progesterone. Activation of the central control system, mediated by the hypothalamus and pituitary, may explain these phenomena. The short-term effect of electro-acupuncture (EA) at acupoints Baihui and Weiken in sows, lowered plasma LH levels in 1 to 2 hours. Endorphins depress LH, whereas naloxone can induce an LH surge. Endorphins may mediate the EA effect. In the long-term, EA increased the frequency and amount of the pulsatile release of LH and increased plasma progesterone levels; in some cases this occurred only 4 to 6 hours after stimulation, but in most cases the changes occurred the next day.

The authors evaluated the pituitary responsiveness of gilts treated with EA in response to injection of gonadotrophin-releasing hormone (GnRH). Electro-acupuncture treatment at reproductive-related AP points had diverse effects on pituitary function in response to GnRH stimulation: pituitary responsiveness decreased (reducing LH release) in the hours post-EA but the pituitary became more sensitive after some days and then triggered a new situation for trophic hormone stimulation. Many researchers confirmed the role of AP in the treatment of female infertility in humans and animals. It was thought that the mechanisms of action were the neuroendocrine effect on the hypothalamic-pituitary-ovarian axis and increased blood flow to the uterus (4, 5, 21, 34). A second hypothesis is that AP has direct effects on gonadal paracrine and autocrine control of steroidogenesis by stimulating the release of epinephrine, catecholoeestrogens, oxytocin and prostaglandin. Acupuncture (at the Baihui and Weiken acupoints) increased epinephrine levels in the semen of boars. In female animals the released epinephrine and catecholoeestrogens can stimulate ovarian steroidogenesis. Electro-acupuncture treatment decreased concentrations of nerve growth factor and corticotropin-releasing factor in ovaries, possibly via inhibition of the sympathetic nervous system. Though the mechanisms remain obscure, AP may affect reproductive function by central control pathways from the endocrine system of the hypophyseal-pituitary-gonadal axis and by the peripheral control pathways via peripheral and segmental reflexes. Acupoint stimulation in somatic segments related to the innervation of the ovaries and the uterus triggers central, peripheral and segmental effects. The action of EA on the brain and pituitary gland is complex and needs more research. No one medical approach is complete in itself and that also applies to AP, which needs support from other systems to maximise its potency (21).

In the 1970s, western research confirmed the analgesic effect of AP. Since then, the study and clinical use of AP have increased rapidly throughout the world. Veterinary acupuncture is also becoming accepted in veterinary science, and international journals report clinical and basic VAP research more frequently now than in the past.

Clinical and experimental herbal medicine

Chinese herbal medicine always uses formulas (multiple ingredients) rather than a single herb. A formula usually has four to ten herbs with a complex guideline of treatment theory that is mainly aimed at maintaining the harmony of body functions and expelling pathogens. Some ingredients are included to enhance the effects of (or act as antidotes to) unwanted effects of other ingredients. The formulas are packaged in different ways: dried and shredded (like tea for home-decoction), ready-to-use decoctions, pills, powders, capsules, pastes, ointments, balms and injections (19, 20, 35).

Documentation of TCM is more than 3,000 years old. There are extensive data and cumulative experiences on the use of CHM. For example, the treatise Shang Han Lun by Chang Chung-Ching (142-220 AD) recorded the use of Koken-Huanglien-Huangchin-Tang (KHHT). It contains pueraria (Koken), coptis (Huanglien), scute (Huangchin) and licorice (Kantsao) in a ratio of 6:3:3:2. Koken-Huanglien-Huangchin-Tang is a common formula for dysentery and gastroenteritis in children. It also controls symptoms of influenza, fever, erysipelas, measles, some eye disorders, headache, and toothache. Experimentally, gentamycin and KHHT were highly (and equally) effective (88% and 85% respectively) in treating piglet diarrhoea. However, this does not mean that KHHT works like an antibiotic. Its mechanism of action is holistic. Besides antimicrobial and other desired effects, it enhances the body's defence system and improves gastrointestinal function (19).

Clarification of the active principle(s) and/or mode(s) of action of HM may contribute to a better understanding of their modes of action at molecular levels. It may also help to evaluate therapeutic efficacy, to maintain herbal quality and to develop novel drugs. This may provide remedies for diseases that modern chemotherapeutics cannot cure. Herbs have active low (alkaloids, terpenoids, saponins, flavonoids) and high (protein, tannin, polysaccharide) molecular weight substances with wide-ranging effects: insect repellents, immunomodulators, and agents with hypoglycemic, sedative, anticancer, anti-inflammatory, antiviral, antibacterial, antiprotozoal, antioxidant, heart-protective, liver-protective, kidney-protective, and other valuable biological activity (19, 28). Table I lists examples of natural medicinals with clinically useful effects.

Table I
Examples of medicaments from the Herbal Materia Medica with clinically useful effects

Effects	Medicaments from the Herbal Pharmacopoeia
Adaptogenic (anti-stress)	<i>Araliae Rz+Rx, Arctii Rx, Asini Corii Colla, Astragali Rx, Berberidis Fr, Biotae Hb, Boraginis Fm, Centellae Hb, Cervi Cornu Parvum, Chionanthi Cx-Rx, Cimicifugae Rz, Cinchonae Cx, Codonopsis Rx, Cordyceps, Curculiginis Rz, Dioscoreae Rx/Rz, Echinacea, Eleutherococci Rx, Fumariae Cacumen+Fl, Galii Cacumen+Fl, Ganoderma, Glycyrrhizae Rx, Gynostemmae Hb, Iris Rz, Lavendulae Fl, Lentinus, Leonuri Hb, Longan Arillus, Morindae Rx, Ocimi Sancti Hb, Panacis Ginseng Rx, Panacis Notoginseng Rx, Panacis Quinquefolii Rx, Poria, Primulae Fl, Ranae sinensis Oviductus, Rhamni Cx, Rhodiola roseae Rx/Rz, Rumicis Rx, Saniculae Hb, Saponariae Rx+Fm, Sassafras Cx-Rx, Schizandrae Fr, Scrophulariae Rx, Shilajit, Smilacis Rz/Rx, Solani Hb, Stachys Betonica, Stillingiae Rx, Terminaliae Fr, Trifolii Pratensis Fl/Hb, Uncariae Rml+Uncis, Violae Fm+Fl, Withania Somnifera, Zanthoxyli Fr/Pc, Zizyphi S</i>
Antimicrobial and anti-febrile	<i>Allii Fistulosi B, Andrographitis Hb, Chrysanthemi Indici Fl, Coptidis Rz, Forsythiae Fr, Gentianae Longdancao Rx, Houத்துyniae Hb, Ilicis Sinensis Fm/Fr, Isatidis Fm/Rx, Lonicerae Fl, Moutan Cx-Rx, Oldenlandiae/Hedyotis Hb, Paeoniae Rubrum Rx, Phellodendri Cx, Picrorhizae Rz, Portulacae Hb, Pulsatillae Rx, Sargentodoxae Caulis, Scrophulariae Rx, Scutellariae Rx, Sophorae Flavescens Hb, Taraxaci Hb and Violae Hb</i>
Antioxidant	<i>Agaricus, Allii B, Amethystum, Angelicae Sinensis Rx, Apocyni Hb/Fm+Rx, Aralia mandshurica, Bupleuri Rx, Calendulae Fl/Rx, Camelliae Fm, Cervi Cornu Parvum, Chrysanthemi Morifolii Fl, Citri Reticulatae Pc, Clinanthium S, Coicis S, Cordyceps Coriandri Fr/S/Hb, Crataegi Fr/S, Curcuma longae Rx, Cuscutae S, Cynanchi Rx, Dioscoreae Rx/Rz, Eleutherococci Rx, Emblicae Fr, Epimedii Hb, Erodii/Geranii Hb, Eucalypti Fm, Ganoderma, Ginkgonis Fm/S, Glycyrrhizae Rx, Gynostemmae Hb, Hippocampus, Hyperici Hb, Lentinus, Leonuri Hb, Ligustri Fr, Lycii Fr, Panacis Ginseng Rx+Rz, Panacis Notoginseng Rx, Panacis Quinquefolii Rx, Perillae Frutescentis Fr/S, Pini Cx, Pini Fm, Polygoni Rx/Rz, Pruni Mume Fr, Rehmanniae Rx, Rhodiola roseae Rx/Rz, Rhois Galla, Rubi Fr Immaturus, Schizandrae Fr, Schizonepetae Hb, Shilajit, Silibi Mariani S, Sophorae Japonicae Fl, Tabebuiae Impetiginosae Cx, Tannic Acid (many plants), Terminaliae Fr, Theae Sinensis Fm, Tremella, Tribuli Terrestris Fr, Trifolii Pratensis Fl/Hb, Tritici Sativae Hb, Uncariae Rml+Uncis, Vaccinii Fr, Valerianae Rx, Visci Hb, Vitis spp., Zizyphi Fr</i>
Immunostimulant	<i>Acanthopanax Rx+Hb, Agaricus, Algae Thallus, Allii B, Amydae Carapax, Andrographitis Hb, Angelicae Rx, Apocyni Hb, Aristolochiae Debilis Rx, Asini Corii Colla, Astragali Rx, Atractylodis Rz, Bufonis Venenum, Cervi Cornu Parvum, Choerospondiatis Fr, Codonopsis Rx, Coicis S, Coptidis Rz, Cordyceps, Coriolus, Crataegi Fr/S, Cucumis Melonis Pedicellus, Curculiginis Rz, Cuscutae S, Cynomorii Hb/Caulis, Cyperi Rz, Dioscoreae Rx/Rz, Dolichoris S, Echinaceae Hb, Eleutherococci Rx, Elscholtziae/Moslae Hb, Epimedii Hb, Eucommiae Ulmoidis Cx, Ganoderma, Garcinia Resina, Gastrodiae Rz, Gecko, Gentianae Rx, Glycyrrhizae Rx, Gynostemmae Hb, Gypsum, Hericium, Hippophae Fr, Houத்துyniae Hb, Hydrastis Rx, Hyperici Hb, Inulae Rx, Isatidis Rx, Ledebouriae Rx, Lentinus, Ligustri Fr, Longan Arillus, Lonicerae Fl, Lycii Fr, Maitake/Griifola, Meretricis Concha, Mori Fr, Morindae Rx, Moschus, Myrrha, Oldenlandiae Hb, Ophiopogonis Rx, Ostreae Concha, Paeoniae Rx, Panacis Ginseng Rx, Panacis Notoginseng Rx, Panacis Quinquefolii Rx, Polygonati Rz, Polygoni Rx, Polyporus/Griifola, Poria, Pruni S, Pruni Mume Fr, Pyrolae Hb, Rhodiola roseae Rx/Rz, Sargassi Hb, Schizonepetae Hb, Shilajit, Sophorae Rx, Stichopus, Tabebuiae Cx, Taraxaci Hb, Testudinis Carapax, Tremella, Tripterygii Wilfordii Rx/Caulis, Tritici Sativae Hb, Uncariae Rml+Uncis, Valerianae Rx, Verbenae Hb, Vitis Fm, Withania Somnifera, Zedoariae Rx, Zizyphi S</i>
Anticancer	<i>Achyranthis Rx, Aconiti Rx, Adenophorae/Glehniae Rx, Agaricus, Agrimoniae Hb, Allii B/Hb, Aloe Hb/Fm, Alpinae Fr, Amydae Carapax, Andrographitis Hb, Angelicae Duhuo Rx, Arctii Lappae Rx/Fr/S, Arisaematis Rz Prep, Arnebiae Rx, Arsenolium, Asparagi Rx, Asteris Rx+Rz, Astragali Rx, Atractylodis Rz, Berberidis Rx, Bletillae B, Bombyx Batryticatus, Bruceae Fr, Bungarus, Camptothecae Hb, Canavaliae S, Carthami Fl, Catechu, Catharanthi Hb, Celastris Rx, Cephalotaxi Rml-Fm, Cervi Cornu Parvum, Chaenomelis Fr, Chelidonium Hb, Cicada, Cissampelotis Hb, Citri Aurantii/Ponciri Fr, Coicis S, Coptidis Rz, Cordyceps, Coriolus, Cremastrae B, Crotalariae Hb, Cucumis Melonis Pedicellus, Cudrania Rx/Hb, Curcuma longae Rx, Cuscutae S, Dichroae Rx, Dictamni Cx-Rx, Dioscoreae Rx/Rz/Tuber, Dryopteridis Rz, Eriobotryae Fm, Erodii/Geranii Hb, Euphorbiae Lathyridis S, Euphorbiae Rx, Fici Fr, Foeniculi Fr, Fritillariae B, Galii Cacumen+Fl, Garcinia Resina, Gelsemium, Gleditsiae Fr, Glycyrrhizae Rx, Gossypii Rx, Graviola Muricata, Hericium, Houத்துyniae Hb+Rx, Humuli Hb, Hyperici Hb, Iridis S, Isatidis Rx, Junci Ma, Laggerae Hb, Lobeliae Hb/Cacumen+Fl, Longan Arillus, Lonicerae Fl, Lumbricus, Lysimachiae Hb, Mahoniae Caulis, Manitis Squama, Meretricis Concha Pulv, Mylabris, Myrrha, Oldenlandiae/Hb, Olibanum, Ostreae Concha, Paeoniae Rx Rubrum, Paradis Rz, Pinelliae Tuber, Polygalae Rx/Cx+Rx, Polygoni Rx/Rz, Prunellae Spica, Pruni S,</i>

Table I (contd)

Effects	Medicaments from the Herbal Pharmacopoeia
Support chemotherapy and/or radiotherapy and counter their adverse effects	<i>Psoraleae Fr/S, Rabdosiae Hb, Rhei Rx+Rz, Ricini S, Rumicis Rx, Sanguinaria Canadensis, Sanguisorbae Rx/Rx+Rz, Sappan Lignum, Sarcandrae Hb, Sargassi Hb/Thallus, Scolopendra, Scutellariae Hb, Selaginellae Hb, Senecionis Hb, Smilacis Rz/Rx, Solani Fr, Sophorae Hb, Stellerae Rx, Stephaniae Dielsianae Rx, Strychni Nux-Vomicae S, Syngnathus, Tabebuiae Cx, Taraxaci Hb, Testudinis Carapax, Trachycarpi Petiolus/Fm, Trichosanthis Fr, Trifolii Pratensis Fl/Hb, Tripterygii Wilfordii Rx/Caulis, Urticae Fm, Vespae Nidus, Viola Hb+Rx, Visci Fm+Rml, Withania Somnifera, Zingiber Nigrum, Ziziphi Fr, Zosteriae Thallus</i>
Both of the above effects	<i>Amethystum/Fluoritum, Aralia mandshurica, Asini Corii Colla, Shilajit, Berberidis Rx, Cardamomi Fr/S, Cinnamomi Cassiae Cx, Cnidii Fr/S, Corni Fr/Arillus, Hominis Placenta, Juglandis S, Ligustici Rz, Milletiae Rx+Caulis, Panacis Quinquefolii Rx, Pruni Mume Fr, Pyrosiae b/Fm, Rubiae Rx, Sepiae Os, Silibi Mariani S, Sophorae Fl</i>
	<i>Acanthopanax Senticosi Rx+Hb, Algae Thallus, Angelicae Rx, Bombycis Mori Faeces, Bufonis Venenum, Bupleuri Rx, Cactus opuntiae Caulis/Rz/Fr, Camelliae Fm, Codonopsis Rx, Curcuma aromatica Rx, Echinaceae Hb, Fagopyri Rz/Fm+Fl, Ganoderma, Gynostemmae Hb, Indigo Naturalis, Lentinus, Ligustri Fr, Lycii Fr, Lycoridis B, Maitake/Grifola, Ophiopogonis Rx/Tuber, Panacis Ginseng Rx, Panacis Notoginseng Rx, Periplocae Cx-Rx, Polyporus/Grifola, Polystictinum, Poria, Rhodiola roseae Rx/Rz, Salviae Rx, Scutellariae Rx, Sophorae Rx, Sparganii/Scirpi Rz, Stephaniae Tetrandrae Rx, Stichopus, Tremella, Trichosanthis Rx, Uncariae Rml+Uncis, Zedoariae Rx</i>

Many poor nations are rich in herbs, thus, HMs are being used to generate national income. Research into HM is focusing on finding ways to treat and prevent certain diseases that respond poorly to WMs. Herbal ingredients have hundreds of known uses in the successful treatment of human and animal diseases. For example, there are increasing reports about the efficacy of many plant compounds in cancer therapy, and much research is ongoing in that area. The quest for effective cancer therapy has highlighted the role of citrus pectin in preventing metastatic cancer, of green tea polyphenols in the treatment of human skin – and prostrate – cancer, and of mushroom glucans and proteoglycans in other cancer treatments. American ginseng (for the treatment of mammary cancer), taxol, and many other natural products, are also being studied. Apart from anticancer effects, mainly via the immune system, some herbs offer great potential for use as part of cancer therapy; they are used after chemotherapy or radiotherapy to counter the side-effects of those therapies (vomiting, nausea, alopecia, weakness, depression, appetite-loss, anaemia, leukopenia, etc.). Table I lists examples of medicinals used in that way.

Some herbs have antibiotic-like actions. Sustainable herbal antibiotics are preferable to synthetic ones from an environmental perspective but there is little evidence to date that any herbs have immediate antimicrobial effects that are anything like those of antibiotics. However, herbs with antimicrobial action also have antifebrile effects. Table I lists some of these herbs. Such herbs have compounds like phytoalexins, diterpenes, protoberberines, limonoids, matrine, and flavonoids, which are active compounds that possess antimicrobial action (19). Traditional Chinese medicine classifies conventional antibiotics as bitter and cold agents; their tendency is to move downward and they are used to clear heat in hot/febrile diseases. Conventional antibiotic treatment often gives unsatisfactory results. Antibiotics act to kill or inhibit the bacteria whose toxins or pyrogens cause the symptoms of infection, including fever. In attacking the organisms only, antibiotics do not address the underlying factors that allowed

the infection to take hold in the first place; the subject often subsequently develops the same, or other infections. TCM explains this phenomenon as *cold agents* (antibiotics) successfully acting to *clear heat* (fever) initially, but leaving some *heat unexpelled (constrained heat)* as a side effect; this may manifest as other symptoms later. In contrast, a good selection of herbs for the initial problem not only acts to *clear and disperse heat*, but acts simultaneously to *release the surface* and *expel exogenous pathogenic factors*. This means to evoke sweating and also to *guard the surface* from further invasion by pathogenic influences. Herbs counter the pathogenic changes and the complex nature of heat better than conventional antibiotics. Therefore, they are more efficient in reducing fever and controlling infection (43, 44).

Herbal medicine is another branch of TM that is likely to make as big a contribution to international veterinary practice as AP; it may even have a greater impact. This will occur only if there is a lot of research to verify the efficacy and safety of HM. Recently, increasing numbers of western veterinarians have become interested in using HM. There are increasing numbers of research projects throughout the world which are assessing the pharmacological, physiological and toxicological aspects of HM and which are strengthening the already strong research which supports the use of this type of medicine. The problem with this new interest in HM is that many veterinarians are beginning to use these techniques without adequate training, or by trial and error, rather than strict scientific investigation. Attempts are under way to identify and isolate the active compounds involved and to understand the underlying mechanism of action.

The authors have screened more than 100 herbal extracts during investigations into steroidogenesis and were able to understand the possible mechanism of action for some of the more potent herbs. They found that some herbal extracts can act as a partial replacement for gonadotropic hormones and their synthetic analogues and can be employed to manage

reproductive disorders in animals (22). The hope is that these findings will contribute significantly to a reduction of the economic impact of reproductive disorders in farm animals and the cost and side effects of hormonal therapy. Research data suggest that the effects of herbal extracts and active compounds in boosting endogenous gonadal steroidogenesis work at the level of the pituitary-gonadal axis. An active ginseng saponin, ginsenoside-Rb1, has been shown experimentally to stimulate LH in rats by acting directly on the cells of the anterior pituitary (40). Likewise, extracts of *Cordyceps sinensis* and *Tribulus terrestris* can increase testosterone production in isolated mice Leydig cells by acting at the genomic and cytoplasmic level (16).

There are many other recent papers that support HM, but which cannot be reviewed in this short paper. Scientific research on the mechanism of action of HM extracts is reported regularly in the literature. The widening field of HM research will contribute to better understanding and will eventually support an integrative approach.

Conclusion

If funding can be found for the widespread research, development and use of TCM and CAM, the annual savings in the international cost of conventional drugs could be billions of dollars. This would force a major change in the western pharmaceutical industry and would, initially at least, have serious effects on investment and jobs; antibiotics are already beginning to be used less and less and many other drugs could also fall out of use in the future (6). The conventional western pharmaceutical industry, which has a vested interest in maintaining the status quo, will of course fiercely resist any major advancement in TCM/CAM. However, it may be possible to tempt the major pharmaceutical industries to slowly diversify into this movement and to convince the scientific community of the benefits of TCM/CAM by in-depth study and clinical trials. In this way, many old jobs could be saved and new jobs created, and two isolated groups of people could be brought closer together for mutual benefit. New areas of work would include biological research, growing, refining, tending, processing and replenishing the herbs, researching the active principles, upgrading quality control, refining the combinations of medicines to eliminate any risk of toxicity or adverse side-effects, etc. Poor countries could develop by harnessing their ability to produce medicinal plants as a source of raw material for the allied industries. The countries in the Himalayan range, South East and Central Asia, South America and Africa, could be encouraged to produce medicinal plants in marginal lands unsuitable for other agricultural purposes, thereby creating opportunities for employment and economic stability. Investment from richer nations should prioritise areas that contribute directly to sustainability, which includes components of TM.

With rapid development and diversification, veterinary medicine could experience revolutionary changes. Some integration of traditional veterinary medicine (TVM) and CAVM with conventional medicine appears to be inevitable, so why not plan now for a really effective integration? The only questions that remain are when and how this can be achieved. For the sake of future generations, it is the duty of this generation to try to integrate the best of every medical system to achieve a SM. Veterinarians in some nations are entrusted with the added responsibility of national security by guarding against bio-terrorism (7). Their first struggle should be to eliminate the defects in current veterinary practices and to try to bring about a positive change.

Veterinarians take risks every day in handling and using WMs; they are obliged to minimise those risks for their own sake and for the sake of their clients, their patients and the future generations of veterinary professionals. The opportunity to develop SM is an opportunity to make great changes which will benefit the environment, and thereby enhance human – and animal – well being. The motto of the International Veterinary Acupuncture Society (IVAS) reflects the outlook that the authors believe modern veterinarians should possess:

‘It matters not whether medicine is old or new, so long as it brings about a cure. It matters not whether theories are eastern or western, so long as they prove to be true.’

This paper has summarised the philosophical and scientific basis for the need to develop SM. Many other topics, which could play a crucial role in this development, could have been included in this discussion (Ayurvedic, African and South American TMs for example), but because of the authors lack of proper knowledge about many of these other forms of TM, the paper has focused on TCM, in an attempt to explain what a vibrant SM could entail. Sustainable medicine for animals is a revolution that began with *Homo sapiens*, the first animal ever domesticated; to expand the concept to include all domesticated animals, it need only be guided in the right direction and given momentum. Science and nature are not competitors; they are two factors that have equal importance in assuring a safer future for the planet. Ultimately, love, respect and wisdom are the three crucial factors that must drive our transition to an SM – ‘the medicine of love’.

Acknowledgement

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Appendix 1

Strategies for developing sustainable medicine

Strategies to merge traditional Chinese veterinary medicine and modern veterinary medicine

Western veterinary medicine and TCVM derive from different backgrounds: the former is objective and scientific, while the latter is subjective and empirical. Each system has its advantages and disadvantages. The attempt to integrate systems into a unified SM will be difficult. However, the struggle will be worthwhile if it can produce sustainable benefits. The need for such an approach is greater now than ever before: the ancient knowledge and art of TM is under threat of extinction (many TMs have already been confined to the history books), and manufacturers of WM are continually having to develop more potent drugs because the old ones have ceased to work; drug resistance is creating a vicious circle. Meanwhile, drug development has become increasingly more expensive and time-consuming. Unless we cease to be totally reliant on WMs for managing disease, the costs and adverse environmental impact will inevitably spiral.

The best option is to develop SM, which emphasizes disease prevention rather than its cure. However, certain diseases, mostly parasitic, infectious and chronic diseases, are hard to control and cure with TM alone. On its own, TVM has limited efficacy; on its own, WM has undesirable aspects. The weaknesses of both systems are what make it necessary to create treatments that are a combination of the two; treatments which provide the very best way of counteracting each disease. The challenge is to identify the best aspects and combinations of TVM and then to see how best to use them with the best aspects and combinations of WM. It has been seen already that AP treatment of reproductive disorders in animals is more efficient when selected herbs are used concurrently (21). It remains to be seen how this combined approach may enhance the existing treatment of complicated cases by WM. Bovine clinical mastitis responds better to a combination of WM and herbal ointments (37). Gastroenteric, respiratory and immune-mediated diseases also respond better to combined treatment with TM and WM. Reliance on only one method of controlling ticks has proved unsuccessful in achieving sustainable and long-term control. At an estimated annual cost of US\$6.5 million, Zimbabwean efforts to control bovine heartwater by the use of acaricides failed to achieve its objective. Recent experience of controlling tick and tick-borne disease (TTBD) in Africa provides an excellent example of the concept of SM. Intensive research concluded that if TTBD is to be overcome, a combined approach must be considered; an approach that includes acaricides, immunisation, management, biological control, enhanced genetic resistance in the host and ethno-veterinary medicine (3, 30).

Strategies to integrate WM and TVM can be adapted to meet the demands of individual cases. There is no doubt that SM will be more efficient than either of the independent approaches. The main problems to be addressed are as follows:

- a) what can be integrated and in which conditions?
- b) are the integrated methods safe?
- c) do the integrated methods interfere adversely with the actions of each other?

The capacity to affect change in the current approaches to animal health care is restricted by limited knowledge and reluctance to try new methods. However, the Indian subcontinent provides an excellent example of the integration of HM and WM for animal treatment. Similarly, AP and CHM are often combined with great success in the People's Republic of China.

Traditional veterinary medicine can help to replace or reduce the need for large doses of antibiotics, anti-parasitic agents, hormones, steroids and other drugs. Traditional veterinary medicine can also be an excellent substitute for WM in treating some chronic diseases, especially diseases in companion animals. Western medicine can be used to support TVM in conditions where TVM alone is less effective, such as in serious infections, parasitism, and some specific pathological conditions. Traditional veterinary medicine, for example, adaptogens, immunostimulants, tonics, and post-treatment support therapy, can be used to minimise the adverse effects of WM. Good examples are the use of AP and/or CHM to reduce the adverse

effects of cytotoxic chemotherapy in cancer treatment (Table I). Many other good examples are available to support the enhanced success achieved by integrating WM and TM (21, 23). However the best approach is to prevent the need to use medicine in the first place. Therefore, as part of the attempt to merge the art, knowledge and drugs of WM and TVM, the emphasis in SM is to create a more natural environment in which animals may need fewer drugs, or if they need medication, to use effective, cheap and safe treatments derived from a sustainable system. Personalised medicines are an emerging concept in new drug discovery (17, 29), but TM has always advocated and practised therapeutics 'tailored' to individual patients.

Recent development in biotechnology has shown that the main factors needed to develop any science are personal and group effort, involvement of interested organisations, teaching and training at university level and financial support from governments. Successful development and implementation of SM will require support at all these levels, as described below.

Personal effort

Although personal effort may seem the least powerful force in the development of SM for animals, nothing worthwhile can occur without such effort. It is essential to encourage veterinarians and students to become involved by arousing their sense of responsibility and reminding them of their important role in creating a sustainable habitat. We must encourage veterinarians in poor nations to use SM to provide a less costly service to their people. This can also contribute to national economies by keeping money at home, instead of spending it on expensive WMs when much cheaper TMs may be just as effective. Also, veterinarians in poor nations could revive the effective aspects of local TVM so that it can eventually support SM in having a wider impact. Regardless of their profession and background, people everywhere have the absolute right to know of the threat posed by the uncontrolled use of WM and commercial agrochemicals in animal production, and to learn and implement ways to minimise the use of these products. People in ecologically and economically fragile areas of poor nations can be mobilised to use SM in animals (9). Individual experiences raised in relevant forums or published reports can provide the basis for further investigation and reference.

Societies and organisations

In 1974, the late H. Grady Young and his colleagues founded the International Veterinary Acupuncture Society (IVAS). Through the efforts of IVAS, and of other Societies, many countries have accepted AP as a valid therapeutic modality. Today, VAP is available in more than 40 countries.

Interested societies may promote TVM by offering professional training courses, publishing journals and organising symposia. Individual veterinarians can contact their National Veterinary Acupuncture Society by consulting the International Veterinary Acupuncture Directory (<http://www.komvet.at/ivadkom/vapsocs.htm>), or IVAS (<http://www.ivas.org>, E-mail: ivasoffice@aol.com). Other groups run professional email discussion lists and arrange courses and symposia on CAVM. They include the following:

- the Complementary and Alternative Veterinary Medicine List (CAVM-L@listerv.petplex.com)
- the Chinese Herb Academy (ChineseHerbAcademy@yahoogroups.com)
- the Professional Veterinary Acupuncture List (PVA-L@yahoogroups.com)
- the Veterinary Botanical Medicine Association (VBMA@milepost1.com).

Other national, regional and global societies and associations work to preserve, investigate and disseminate knowledge of TVM. Some are thriving, while some need support to continue their mission. Biased governmental attitudes and lack of funding explain the sorry state of many of the societies and organisations that advocate TVM. A revival of interest and increasing markets for TVMs are attracting investors, who may be persuaded to support these societies and organisations for mutual benefit. It will take a lot of effort to match the strength of the conventional veterinary societies and organisations, which enjoy the support of pharmaceutical companies and allied industries. However, as SM cannot and does not wish to exclude WM, it must pursue a cohesive and careful approach. A good example of such an approach was at the 11th Federation of the Asian Veterinary Association at Taipei in 2000, where a TVM

forum was provided for the Chinese Society of Traditional Veterinary Science. This society is dedicated to the development of TVM, through conferences, veterinarian training, and the publication of journals. The authors thank those organisations and societies, especially colleagues working at grass-root level, for their efforts. Distance learning, e-mail discussion groups and the World Wide Web have made it easier to disseminate ideas on a wider scale. However, free availability of technical papers in hard copy still remains the preferred and most effective source of ideas in less developed regions.

Co-operation between traditional Chinese medicine and traditional Chinese veterinary medicine

Throughout history, TCM has been much more advanced than TCVM. Veterinarians should be encouraged to seek frequent contact with medical doctors and to conduct joint experiments on animals in an ethical way that would provide vital information for the development of SM. The mutual exchange of information between the two fields improves clinical results and both sides benefit from the shared experience. Some national VAP societies have excellent contact with medical AP experts and benefit from this co-operation. Such mutual co-operation between veterinarians and doctors is recommended in all TM systems. All those interested in TVM need to co-operate in a combined effort to counter the heavy influence of WM and the active efforts of commercial interests to exclude TM from serious consideration.

University training and research

Advancement of TCM, and especially research in TCM, needs wholehearted support within medical and veterinary universities. Unfortunately, university courses that integrate WM and TCM at undergraduate or postgraduate level are rare. Those universities solely dedicated to the study of TM are falling behind the rest. Only a few veterinary schools in Europe, America and Australia offer basic AP classes. Guest lecturers from national or regional groups of IVAS give most of the AP classes. Western veterinary schools should send faculty members to study AP in the People's Republic of China, or invite experts in TCM to teach. Also, relevant research must be funded. The veterinary curriculum in poor nations is based on WM. Reasons for this include the lack of a locally developed TM curriculum, poor availability of TM literature, and lack of qualified TM teachers. Also, veterinarian schools in many countries teach only in English, and it is advocates of WM who write most veterinarian textbooks.

Very few veterinarians study TVM and most of those trained in TVM are in private practice. Successful TVM-trained practitioners usually have excellent incomes. If universities want such practitioners to teach, they must offer realistic salaries. Also, in societies where veterinarians have yet to receive due respect, veterinarian students hesitate to learn and advocate TVM for fear of being ridiculed. Conventional veterinarian curricula deserve criticism for their bias against TVM; the current system aims to produce graduates equipped only with the art and knowledge to earn a living. The ethics of service to society, humane relationships in treating animals, and the role of veterinarians in contributing to sustainable systems are rarely discussed. It is encouraging that a few universities and institutions teach such topics, but all veterinarian schools should consider the usefulness of including the science of TVM and other aspects of sustainable animal husbandry in their curricula.

Government and private support

Biopiracy – the theft of 'green gold' (indigenous medicinal herbs) and traditional knowledge – is a new development in the commercial race for patent rights. In an attempt to protect indigenous rights, the 1992 Convention on Biological Diversity states that: 'a country owns the biological resources within its borders'. The Convention urges governments to intervene to ensure that the rights of the traditional communities concerned are upheld. The aim is to improve the economic conditions of indigenous peoples as an incentive for them to preserve their natural habitats. Government investment is essential to develop and modernise TVM. Governments should initiate ways of recording information about local TMs, research their efficacy, and preserve and promote those that are safe and effective. While attempting to modernise agricultural systems, governments in poor nations should regulate and monitor the misuse of chemicals and drugs and emphasise a sustainable approach. It has only been through the efforts of governments that subtherapeutic use of some antibiotics has recently been restricted in some countries of the EU (39, 41).

In formulating policies to safeguard the future of local livestock industries against the full implementation of free trade, an approach oriented towards SM should be reviewed and implemented. Governments should also seek support from farsighted pharmaceutical companies and give incentives for their investment in research into, and development of, TVM. Adequate funding for research and training will accelerate the achievement of results. Sponsored activities like seminars, workshops, and publications should go beyond serving as advertisements of specific brands by promoters of SM.

Ultimately, the best hope may be that even if some governments do not yet understand, veterinarians throughout the world appreciate the urgent need for SM in the 21st Century. If this understanding is to be exploited, large-scale action must be taken now. If interested individuals interact with other interested parties, and join and support the various organisations which have organised workshops and created web sites to answer queries, information about the benefits of TMs can be disseminated to more and more people, more research and development will take place, and, hopefully, a more peaceful life can be created for the future.



Une médecine vétérinaire durable pour une ère nouvelle

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Résumé

La durabilité vise à créer des conditions de vie harmonieuses sur terre sans pour autant menacer les ressources naturelles essentielles qui devraient revenir de droit aux générations à venir. La « médecine durable » n'est que l'une des nombreuses démarches possibles pour garantir cette durabilité et la coexistence pacifique. Cette forme durable de médecine propose un système peu compliqué pour préserver la santé de l'homme et des animaux, que ce soit aujourd'hui ou dans un avenir plus éloigné. Elle fait appel à la sagesse, au savoir et à l'art de guérir des Anciens, qu'elle associe aux avantages et aux progrès techniques de la science moderne et des autres disciplines médicales, et constitue une approche intégrée de la guérison fondée sur des moyens préventifs, fiables et abordables.

En outre, le terme de « médecine durable » sous-entend que les principaux produits thérapeutiques utilisés dans sa pratique peuvent être remplacés ou reconstitués en causant un minimum de dommages à l'environnement après leur récolte. La médecine durable a pour but de maintenir l'équilibre naturel, d'autoriser la coexistence et la reproduction des quelque 7 à 100 millions d'espèces vivantes présumées et d'assurer l'avenir à long terme de notre planète.

La planète est en proie à une crise écologique : l'environnement a subi plus d'effets anthropogènes préjudiciables au cours du dernier siècle qu'aux siècles précédents. L'usage abusif de médicaments et l'épuisement concomitant du système immunitaire chez l'homme et les animaux suscitent une vive inquiétude. Comme l'enseignant de nombreuses médecines traditionnelles, la faculté d'un système de défense efficace à évoluer sous la pression des facteurs endogènes et exogènes s'avère déterminante pour l'état de santé et la survie. Une telle adaptation ne peut s'envisager qu'en privilégiant une approche préventive plutôt que curative des soins de santé. Les partisans de la médecine durable

préconisent cette même démarche, qui repose sur un diagnostic correct et un traitement médicamenteux personnalisé et adapté.

Selon les auteurs, la médecine durable, qui conjugue les avantages des médecines moderne, traditionnelle et complémentaire, représente la démarche idéale pour la prestation de services de santé de meilleure qualité à l'homme et aux animaux. Ils retracent rapidement l'historique des médecines traditionnelles et proposent des stratégies pour assurer un développement durable de la médecine. Ils soulignent également quelques facteurs importants dans l'élaboration d'une médecine durable destinée aux animaux et encouragent les vétérinaires à adopter une telle approche dans le traitement des animaux.

Mots-clés

Acupuncture – Classique – Complémentaire – Durabilité – Environnement – Médecine vétérinaire – Parallèle – Phytothérapie – Traditionnel.



Medicina veterinaria sostenible para la nueva era

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Resumen

El concepto de sostenibilidad puede resumirse en el objetivo de armonizar la vida en la Tierra sin poner en peligro los recursos naturales esenciales que deberían constituir el patrimonio inalienable de las generaciones venideras. La 'medicina sostenible', que no es sino una de las vertientes en que puede declinarse y materializarse la coexistencia pacífica, preconiza un sencillo sistema para conservar la salud de personas y animales, ahora y en los muchos años por venir. Esta clase de medicina reposa en una combinación de sabiduría, conocimiento y artes curativas ancestrales y de las ventajas y los logros técnicos dimanantes de la ciencia moderna y de otras áreas de la medicina. Se trata de un sistema integral de curación preventiva, segura y asequible.

La expresión 'medicina sostenible' implica asimismo que las principales sustancias terapéuticas utilizadas en su ejercicio pueden ser sustituidas o repuestas con un mínimo de perjuicios ambientales después de la recolección. Su objetivo se cifra en mantener el equilibrio de la naturaleza y hacer así posible que entre 7 y 100 millones de especies de seres vivos, según las estimaciones, coexistan y se reproduzcan, y que el planeta tenga asegurado su futuro a largo plazo.

La Tierra se encuentra en plena crisis ambiental: las agresiones ambientales de origen antrópico fueron mayores en el último siglo que en cualquiera de los anteriores. Uno de los grandes motivos de preocupación es el uso incorrecto de los medicamentos y la pérdida de defensas inmunitarias que ello provoca en personas y animales. Muchos sistemas de medicina tradicional enseñan que la clave de la salud y la supervivencia reside en el sistema de defensa y su capacidad de adaptación eficaz, y ello pasa necesariamente por un tipo de atención médica en que la prevención prime sobre la curación. Este planteamiento es exactamente el mismo que defienden los partidarios de la

medicina sostenible, basado en el diagnóstico correcto y la utilización de una medicina personalizada, adaptada a las características de cada cual.

Los autores postulan que la medicina sostenible (combinación de las ventajas respectivas de los sistemas médicos modernos, tradicionales y complementarios) es el método idóneo para atender mejor la salud de personas y animales. En este artículo repasan brevemente la historia de las medicinas tradicionales y esbozan estrategias para que la medicina sostenible se desarrolle. Tras hacer hincapié en una serie de factores importantes para que este sistema se vaya incorporando a la atención sanitaria, tratan de alentar a los veterinarios a que adopten métodos sostenibles de tratar a los animales.

Palabras clave

Acupuntura – Alternativa – Complementario – Convencional – Herbolaria – Medicina veterinaria – Medio ambiente – Sostenibilidad – Tradicional.



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