

Herbal Wisdom: memory and migration

Cathy Avila, Sue Evans & Annette Morgan

**Copyright ©2011 Cathy Avila, Sue Evans & Annette Morgan.
This text may be archived and redistributed both in electronic
form and in hard copy, provided that the author and journal are
properly cited and no fee is charged.**

Abstract: Within contemporary Western herbal medicine, traditional knowledge and modern science are combined to provide a unique meeting of patient, practitioner and plant. In the Australian context, herbalists have based their practice on knowledge which originates from the traditions of Europe, and has more recently been influenced by traditional medicine from Asia. The combination of these diverse ways of knowing—traditional and modern, Eastern and Western—means herbal practitioners are influenced by ancient philosophy alongside phytochemistry and biomedical sciences. The challenge for herbal medicine today is that faced by all living (as opposed to ossified) traditions: how is a practice forged which retains what is valuable from the past while establishing relevance to the 21st century? We illustrate these issues in the context of the conference theme of ‘food for thought’ and consider medicinal plants which are used for the improvement of cognition. We focus on the therapeutic use of common herbs from the Eastern and Western traditions and present the scientific research which shows their ability to facilitate cognitive function and the laying down of memory. We also tell their traditional stories which indicate that these actions have been recognised and utilised for centuries. We go on to demonstrate, via case studies, the clinical application of this knowledge and in particular the importance of ancient practice of synergistic prescribing which occurs when a number of herbs are prescribed together in a formula. Scientific understanding of the basis of this practice is being developed which further complements and validates traditional herbal wisdom.

Keywords: complementary medicine; herbal medicine; memory performance

Introduction

In this paper, we use the conference theme ‘Food for Thought’ as an opportunity to describe the practice of Western herbal medicine in Australia, interpreting it literally, in order to allow consideration of the use of medicinal plants in the enhancement of cognition. We locate this discussion in the context of professional herbal practice, describing its origins, challenges and current practices. This is a paper about Western

(European) herbal medicine, and highlights its history, its knowledge base and the clinical approach of its practitioners. These are complementary 'lenses' through which to describe Australian herbal practice.

The first section of the paper deals with the cultural and political origins of Western herbal medicine in Australia, and outlines the challenges faced by the profession as it attempts to take its place within the healthcare system after a period of isolation. The second section illustrates the traditional and scientific basis of usage underpinning two cognitive enhancing herbs—one from the European tradition and one from the Ayurvedic tradition and both widely used in Australia today. And the third section contrasts the philosophy of the biomedical paradigm with the philosophy underpinning Western herbal medicine through an exploration of contemporary clinical practice.

Part 1 – Western herbalists in Australia

There are around 2000 practitioners of Western herbal medicine and naturopathyⁱ in Australia. While these practices are largely outside state systems of healthcare, they are practiced legally, under common law. This is private medicine: there is no state funding. Further, despite long campaigns to introduce statutory regulation for practitioners, as occurs with other healthcare workers, this has not occurred.

When Lin, Bensoussan et al. (2005) documented these practices (Western herbal medicine and naturopathy), they found that most practitioners are women who work in private clinical practice, as sole practitioners and in clinics with other healthcare practitioners. They utilise both conventional Western medical diagnoses and non-conventional diagnoses, and often explain ill-health in terms of functional disorders. Non-conventional diagnoses may arise from unconventional diagnostic tools such as iridology.

Practitioners typically conduct a one-to-one, private consultation with clients, and provide advice regarding diet and lifestyle, and dispense an individually prescribed mix of either dried or encapsulated herbs or more commonly, herbal extracts (Casey, Adams et al. 2007).

Origins of Western herbal medicine in Australia

The thousand or so souls of the First Fleet who arrived at Botany Bay in January 1788 were equipped with a wide range of supplies to enable settlement. These supplies included plants, chosen by botanist explorer Sir Joseph Banks, which would be used for food, medicines, shelter and for aesthetic purposes (Frost 1993). Among them were a number of medicinal plants, which were then included in a herb garden that was established by early March 1788 in the Rocks area of Sydney 'to provide the needs of Sydney General Hospital' (1990).

The medical practices of the colonists covered a number of modalities, and medicinal plants were part of medical treatment. According to Martyr, Australia was

... founded in the heyday of unrestricted medical practice in Britain. British healers were a diverse lot: the physician, the surgeon, the barber, the bonesetter, the empiric, the midwife and the apothecary were some of the more common categories (Martyr 2002 p 18).

Contrary to the situation in other colonies, including the US and many parts of South America, there is little evidence of systematic transfer of medicinal plant knowledge between Indigenous Australians and early European settlers. The limited surviving documentation of exploration into medical botany and interest in Indigenous medicinal plants in the early years of settlement (MacPhersson 1927) suggests that the utilisation of these plants was restricted and localised. As a result, today there is little use of indigenous plants by Australian herbalists. The reasons for this have not been widely discussed within herbal medicine, but may include the lack of agricultural expertise of many of the earliest settlers, the dissimilarity of the Australian flora with that of Europe, and the sparse population which was a disincentive to the commercialising of herbal products and the development of a medicinal plant industry. In any event, from the beginnings of European settlement, Western herbal medicine in Australia has been almost exclusively dependent on non-native plants, whether locally grown or imported.

Early practice

In the early 19th century, Australian herbalists were one of a number of groups of medical practitioners practising without restriction. Moves to regulate medical practice began in the mid 19th century (Willis 1989)—an early example being the 1856 Medical Practitioners Bill in Victoria which was rejected because of the detrimental effect it would have on ‘free trade in physic’ (1858 p 434). This Bill was the first of a series of bills aimed at restricting medical practice to the professional advantage of one group of practitioners-doctors. Herbalists responded to these attempts by their rivals to secure medical authority by starting up their own professional associations, which in turn organised a range of activities including distributing newsletters, organising petitions and lobbying politicians and state officials. A petition of 5000 signatures was presented to Victorian State Parliament in 1894 to object to the increasing power of medicine and to the ‘state support of one system over another’. While medical practitioners were eventually successful in gaining regulation, parliamentary debates which accompanied these Bills regularly referred to the disadvantage which would be suffered by herbalists and homeopaths as the individual pieces of legislation were introduced (Evans 2009).

Although early attempts to establish a system of state-endorsed medicine was vigorously contested, by the early decades of the 20th century, the fortunes of the herbalists were beginning to fade as those of medical practitioners and the pharmaceutical companies rose. The golden years of biomedicine were the dark years for herbal medicine. Herbalists in Australia, like their colleagues in the US and the UK (Saks 2003), experienced sustained professional marginalisation and harassment. Their methods were vilified in the press and in professional journals, medical practitioners were banned by their associations from working with them, and their professional

survival was threatened as numbers of practitioners fell. Yet, these difficulties were never translated into legislation and the practice of herbal medicine remained legal, however tenuous the position became for practitioners (Evans 2009). The situation remained difficult for practitioners of natural medicine for most of the 20th century.

By the closing years of the 20th century, medical preferences of the Australian public had changed, and individuals began to demand more choices and increased participation in decisions about their healthcare—and in particular they demanded increased access to natural medicine. They were not abandoning mainstream medicine, but rather requesting additional interventions, in what can be understood as a form of medical pluralism (Siahpush 1998; Sharma 2000; Lyng 2010). And they were prepared to pay out-of-pocket to receive these treatments, which were (and are) rarely available within the state-supported health system. The steady increase in public acceptance and utilisation of natural medicine is reflected in the language used to refer to it—prior to the 1970s it was ‘quackery’, before it became ‘alternative medicine’. In the 1980s it became ‘complementary medicine’ before the introduction of ‘integrative medicine’ in the 1990s.

Current herbal practice

Recent figures suggest that 68.5% of Australians use natural and complementary medicine, and for most of these individuals their use of these therapies complements rather than replaces their use of pharmaceuticals and biomedical approaches (Xue, Zhang et al. 2007). As well as Western herbal medicine, popular interventions include nutrition, massage, meditation, chiropractic and aromatherapy, and the provision of products related to these therapies has led to the development of a lucrative natural products industry. As we move into the second decade of the 21st century, the popularity of natural medicine shows no signs of abating.

This change in position, from virtual exclusion from the delivery of mainstream healthcare to such a popular status over a few short decades, inevitably brings its own tensions. The period of marginalisation for herbal medicine went on for most of the 20th century: an era which was one of immense change for all other healthcare professions. Massive resources were invested in the development of a complex healthcare infrastructure, which enabled extensive training of professionals, funded delivery of services, and state-supported research into treatment. Most importantly, during the 20th century medicine was underpinned by science. In all of these areas, the exclusion of herbal medicine meant that, by the end of the 20th century, it had been left far behind.

As it regained popularity, herbal medicine needed to play catch-up. Issues requiring the profession’s attention included addressing safety and risk of products and practices, engaging with the changing regulatory landscape (Saks 2002; Bensoussan, Myers et al. 2005; Lin, Bensoussan et al. 2005; O’Sullivan 2005) and establishing relationships with a now active and powerful industry group—the manufacturers of herbal products (Jagtenberg and Evans 2003). To this end, investment in appropriate educational and research programs is a priority. In turn, this cannot be done without the development of appropriate career paths for practitioners, and capacity building for the leaders of the

profession (McCabe 2005). There is still a level at which herbal medicine can be seen as pulling itself up by its bootstraps.

A further, and possibly greater, challenge for contemporary herbalists, whose understanding of medicinal plants is based on traditional knowledge, is to incorporate and reconcile modern scientific understandings into their knowledge base and practice. Phytochemistry and biomedical sciences, like all sciences, are based on observable facts, formalised as scientific statements, and tested systematically by observation and experiment (Dunbar 1995). In contrast, traditional knowledge is based on narrative, and transmits a broad range of information (Lyotard 1997). Further, 'science has always been in conflict with narratives. Judged by the yardstick of science, the majority of them prove to be fables' (Lyotard 1997).

The two systems—tradition and science—provide very different perspectives on medicinal plants, and require a different focus. Traditional knowledge about medicinal plants can be understood as 'folk knowledge'. As such, it is based on oral communication with an emphasis on practical application rather than theoretical consistency. Thus recipes and household hints, references to myths, literature and popular culture, information about habitat, cultivation and harvesting are all included in the development of an understanding the plant. This information can appear unreliable when compared with a specific phytochemical analysis, or the reports of a clinical trial which has tested one particular preparation of a plant within the context of a double-blind placebo-controlled clinical trial. In contrast, scientific knowledge is unable to maintain the breadth of folk understanding, and the strong connection with the natural world—the understanding of the plant as a plant, rather than as a pill or an extract—with which traditional herbal knowledge is imbued. While claims have been made that 'contemporary herbal medicine combines scientific and traditional understanding', the profound differences between these two ways of knowing have been rarely articulated within Australian herbal medicine.

These issues are best demonstrated through example. In keeping with the conference theme of 'Food for Thought' two herbs used for cognitive enhancement which can be understood both in terms of science and tradition are discussed below. The herbs are *Bacopa monnieri* and *Rosemarinus officinalis*.

Part 2: Herbs for cognition: the science, the tradition

In this section, the traditional understanding and usage of two herbs widely prescribed for memory and cognitive function in current Australian herbal medicine practice is described in the context of recent scientific investigations into constituents and efficacy. The two herbs are *Bacopa monnieri* (Bacopa) which originates from the Ayurvedic tradition and *Rosemarinus officinalis* (Rosemary) which is part of the European herbal tradition. Research carried out by the author (Morgan) contributes to this scientific evidence.

Memory impairment and dementia are increasingly prevalent in the current demographic climate of an ageing population (Australian Institute of Health and Welfare 2010). As well as the pathological cognitive loss of neurodegenerative disease,

many older persons are experiencing memory loss as part of the physiological process of ageing (Kawas 2003). As shall be illustrated in the discussion below, botanical approaches have much to offer in the improvement of cognitive function, including modulation of factors such as oxidative stress, inflammation and neurotransmission.

Brahmi *Bacopa monnieri*

Bacopa monnieri is a herbal medicine used since antiquity in the traditional Ayurvedic medical system of India for its cognitive enhancing effects. The herb was first described in 800 BC and indications for its medicinal use recorded in one of the three earliest Ayurvedic medical treatises the 'Carak Samhita' in the third century BC (Singh & Dhawan 1997; Singh & Dhawan 1982). Its common name Brahmi derives from the name of the Hindu creator Brahma and reflects the herb's reputation as a brain tonic because the brain is seen as the creative force within humans. Within the ancient Ayurvedic texts the herb is classified as 'Medhya Rasayana' which pertains to it possessing mental/intellectual enhancement properties (Medhya) as well as to its capacity to foster longevity (Rasayana).

A number of pre-clinical and clinical studies support this traditional understanding and usage of Bacopa. Laboratory studies have demonstrated antioxidant (Tripathi et al. 1996; Bhattacharya et al. 2000; Sairam et al. 2001; Sumathy et al. 2001; Sumathy et al. 2002; Russo et al. 2003^a; Russo et al. 2003^b) and cholinergic (Das et al. 2002; Bhattacharya et al. 1999; Dey et al. 1964) actions in the brain as well as improved memory and cognitive performance in animal models (Singh & Dhawan 1997; Singh & Dhawan 1982; Kishore & Singh 2005).

Human clinical trials of Bacopa have also demonstrated improved memory performance. Some of these trials are limited by methodological flaws such as lack of blinding, small sample sizes, or use of outcome measurements which are not well validated. A study carried out by the author (Morgan) assessed the efficacy and safety of Bacopa. This investigation focused on people over 55 years of age, since this is the population in which memory impairment becomes apparent. The study was carried out at Southern Cross University, Lismore, Australia in 2005 (Morgan & Stevens 2010).

Clinical trial

A 12-week, randomised double-blind placebo-controlled, parallel group clinical trial was carried out to assess the efficacy of Bacopa for the improvement in memory performance and for the occurrence of side effects. Participants were self-selected from the general population. They were aged 55 years or over at the commencement of the trial. Participants were without dementia, depression or other serious health conditions and did not use psychotropic medications. They were randomised to one of two treatment conditions, either a tableted extract of *Bacopa monnieri* called Bacomind™ (300mg/day, standardised to contain at least 40% bacosides), or an identical placebo.

Participants attended three clinical evaluations. The first was an initial screening session (prior to the commencement of the study) designed to ensure that volunteers were eligible for enrolment in the study. The second evaluation occurred at the start of the study when neuropsychological function and subjective memory performance were assessed. This provided the baseline data. The third evaluation was held at the end of the trial, some 12 weeks later, when the neuropsychological function and subjective memory performance assessment was repeated. Side-effects and study compliance were also recorded.

The outcome measures used were four well validated neuropsychological tests: the Rey Auditory Verbal Learning Test (AVLT) (Rey 1964), the Rey-Osterrieth Complex Figure Test (CFT) (Osterrieth 1944), the Trail Making Test (TMT) (Reitan 1958) and the Memory Complaint Questionnaire (MAC-Q) (Crook et al. 1992).

The results of the study were as follows. From 136 people who elected to participate, 103 people met study entry criteria and 98 of these commenced the trial. Of these, 81 participants completed the trial and provided useable data for the end point analysis. The active group who took *Bacopa monnieri* had significantly improved verbal learning (memory acquisition) as well as delayed recall (retention) as measured by the AVLT ($p < .05$) compared to the group taking the placebo tablets. In contrast to the positive findings in the AVLT, improvements were noted in both groups in the CFT, MAC-Q and TMT, but there were no statistically significant differences between groups for these tests. The Bacopa group reported a higher incidence of gastro-intestinal (GIT) side-effects than the placebo group, these predominantly being increased stool frequency, abdominal cramps and nausea. No other significant adverse effects were found. These results demonstrated that Bacopa significantly improved memory acquisition and retention in older Australians.

Five other 'gold standard' (well designed, randomised, placebo-controlled and double-blind) clinical trials provide evidence for efficacy in cognitive and memory performance improvement for this plant (Calabrese et al. 2008; Raghav et al. 2006; Roodenrys et al. 2002; Stough et al. 2001; Negi et al. 2000). The clinical trial findings concur with previous human and animal studies, as well as the traditional Ayurvedic understanding of the herb and its use in clinical practice. The beneficial effects on memory observed may be due to previously demonstrated antioxidant and cholinergic effects of the herb on the central nervous system. The side-effects observed lend support for a cholinergic effect, or may have been due to saponin-mediated irritation of the GIT.

Rosemary *Rosemarinus officinalis*

Rosemary has a long history. It is native to Southern Europe, widely used as a symbol of remembrance in war memorials, funerals and weddings (Grieve 1931). In Shakespeare's Hamlet, Ophelia says: 'here's rosemary, that's for remembrance'. It was an important constituent in Hungary water, dating from the 1300s, which Culpeper (1638) suggested for use in nervous afflictions. Ancient Greek scholars are said to have worn garlands while studying, while modern ones burn its oil when studying for exams.

Compounds from Rosemary have been shown to be potent antioxidants containing both water soluble rosmarinic acid, which is found in the mint family and is similar to Vitamin C and lipid soluble carnosol, which has stronger antioxidant properties than Vitamin E. (Gordon & Kourimska 1995; Richheimer et al. 1996). Lipid soluble antioxidants are especially useful in brain tissue which is very rich in polyunsaturated fat. It is interesting to note that Rosemary is historically cooked with fatty meat. Rosemary's marked antioxidant properties have led to its use as a replacement for synthetic preservatives in food and cosmetics (Etter 2004). Furthermore, Rosemary also shows potent anti-carcinogenic action: applied to cooked hamburger meat it reduced heterocyclic amine content by 30-100% (University of Arkansas 2008).

Exciting recent *in vitro* research which led to two expedited publications in neuroscience journals showed that Rosemary's constituents carnosic acid and carnosol are potent enhancers of Nerve Growth Factor synthesis in human nerve cells (Lipton, 2007). Nerve Growth Factor is essential for health, growth and repair of nerve tissue. This research supports the clinical use of Rosemary in stroke recovery and cognitive degeneration (ibid; Satoh et al. 2008; Burnham Institute 2007).

One randomised, controlled clinical study with 140 healthy volunteers compared the effects of inhalation of either the essential oil of Lavender or Rosemary oil or a placebo inhalation, on cognitive performance and mood. Rosemary led to significant enhancement of memory quality and secondary memory factors, though a decreased performance speed was noted compared to the placebo group (Moss et al. 2003). As with Bacopa, the scientific research supports the traditional knowledge and usage of Rosemary.

This demonstrates that modern scientific research validates the traditional usage of two ancient herbs from Eastern and Western herbal medicine traditions—Bacopa and Rosemary. Both plants are currently used in Western Herbal Medicine in Australia and both hold great promise in the promotion of healthy cognitive function and neuroprotection. The ways in which these and other herbs are utilised in clinical practice is the focus of Part 3.

Part 3: Herbal Wisdom: the paradigm of clinical practice

In Part 1 we established that herbal practice pre-dates contemporary biomedicine and in Part 2, we demonstrated the ways in which modern herbal practice embraces the gold standard methodology of biomedical science. In this final section we consider the clinical practice of Western herbal medicine and describe a case history to illustrate how herbal practice incorporates the insights of biomedicine without adopting its paradigm as a driving philosophy.

Australian graduates of courses in herbal medicine and naturopathy study anatomy, physiology, pathophysiology and clinical diagnosis using texts published for the biomedical market. We therefore need to ask: is then the reductionist philosophy of the biomedical paradigm that sees health in terms of the absence of disease, the philosophy that guides the therapeutic decisions of herbalists? Is contemporary Western herbal medicine simply biomedicine without pharmaceuticals? Given that at least 120

prescription medications are extracted from some 90 different plants (Cordell 2004), is this a significant difference?

Determinants of health

The biomedical paradigm, medicine underpinned by science, is the backdrop of 21st century healthcare and ingrained in our culture. The story of Louis Pasteur, the germ theory of disease and the role of antibiotics in the treatment of infections are taught in primary school. Historically the application of this theory has produced great benefits. An understanding of the role of micro-organisms in disease was the driver for improvements in medical and personal hygiene as well as the implementation of social reforms including sanitation and clean water (Rosner 2010). The aim of this section is not to trivialise these benefits, but rather to draw attention to the concepts of health that this entrains.

Central to the biomedical view is the hypothesis that disease, whether due to micro-organisms, poisons or stressors, can be explained entirely in terms of defective physiological and biochemical processes, which often give rise to symptoms. The changes in biochemical parameters, together with associated symptoms, can be classified into diagnostic categories. Once a diagnosis is made, treatment is directed at resolving the biochemical defect, by removal of the micro-organism, toxin or defective cells or by the addition of pharmaceuticals that modify biochemistry resulting in the removal of symptoms and the return to 'normal' biomedically-defined parameters. Thus health becomes the absence of disease. In this mechanistic and reductionist view, the disease rather than the patient is the focus. Was your last visit to a doctor about you or your disease?

If contemporary Australian Western herbal medicine operates under different assumptions about health, then this should be reflected in practice, and we argue that it does. An initial herbal consultation lasts around forty-five minutes and starts in the familiar manner, with inquires about the presenting complaint. Patients are encouraged to describe what they experience, and what it means to them. As the consultation continues detailed questioning focuses systematically on mental and emotional health and then on each major organ or system. Information about diet, lifestyle and any occupational hazards are also gathered, along with descriptions of important relationships, family medical history and personal medical history. A physical examination is carried out and where available blood chemistry, cytology, haematology and other laboratory investigations such as blood glucose and urine analysis may also be taken into account.

This wide range of inquiry indicates that health as defined in Western herbal medicine goes beyond immediately concerning symptoms. The determinants of health are seen in the function of every system of the body and beyond, extending to relationships with family, community, environment and work. An individual is seen as a complex living system, at once a single entity and a part of other complex systems (Woodhouse 1997). While a mechanistic analogy helps us to understand some of the subsystems, and the laws of physics, chemistry and biochemistry can be seen to operate within these, they cannot account for all the observed phenomena of health or healing. In models used in

Western herbalism individuals are conceived of as living systems; self-healing, constantly self-renewing and adaptable (Millenson 1995). For the herbalist, this holistic model has its roots in humoral medicine and dates back to the fourth and fifth centuries BC when Hippocrates, among others, conceived of health as a dynamic balance or blend of four humors that enervated the body. Sickness was conceived of as a state of imbalance and the physician's duty was to aid the restoration of balance by aiding the healing powers of nature, *vis medicatrix naturae* (Sigerist 1961). This vitalistic theory guided not only herbal medicine, but all medicine into the Middle Ages and beyond.

Cognitive decline: a case history

The following case history, chosen because the patient presented with concerns about her memory, demonstrates the approach of Western herbal medicine.

Jane, a 54 year old primary school teacher, has been experiencing symptoms associated with menopause: hot flushes, restless sleep, night sweats, anxiety, poor memory and fatigue. She discussed her symptoms with her GP who suggested Hormone Replacement Therapy (HRT), but acknowledged that this was unlikely to improve her memory. Jane had heard that herbal medicines can be useful in menopause and wondered if this approach would be more helpful. In the consultation that followed, Jane revealed that her mother suffers from dementia and that this family history is the reason that her forgetfulness upsets her so much. Every time she finds herself hunting for the right word or has misplaced the car keys, she feels a spike of anxiety and dread. Loss of sleep from night sweats is really taking its toll and Jane feels she is only just coping with her work load. Jane is passionate about her art and has exhibited annually for over 20 years; but not this year. She hasn't had the energy to produce any artwork. Nor has she time or inclination to exercise. Jane acknowledges that she feels quite depressed. Her most troubling additional symptoms are digestive, including bloating and flatulence. Jane's hormone studies are consistent with menopause. No abnormalities are revealed by her other blood tests, so anaemia and thyroid problems are excluded as a cause for her tiredness. On the plus side, Jane eats well, including a plentiful variety of high quality food, mainly organic whole foods with lots of fruit and vegetables. Relations with her husband and adult children are good, she likes teaching and has supportive friends.

As illustrated in this case history, herbalists takes the time to explore a wide spectrum of factors that may predispose to ill health and look for evidence of functional strengths as well as weakness, even when this information bears no direct relationship to the medical diagnosis. The aim is to strengthen the body from within so that healing can occur and this means paying attention to which organs, systems and even which types of tissue are showing signs of dysfunction and supporting them.

This concentration on the promotion of health from within makes sense. Consider the Spanish influenza pandemic (1918-1920), which is estimated to have killed between 20 and 100 million people worldwide (Murray, Lopez, Chin, Feehan, & Hill 2006). Despite this appalling loss of life, most people survived and still more never displayed symptoms. Murray et al. compared average annual death rate during the pandemic with the average annual death rate in the years both before and after it (Murray et al. 2006). This research found that all cause mortality was increased by 0.29% in Australia, while

Spain suffered a 1.49% increase in annual mortality in those two years. Clearly, micro-organisms, while necessary for infection, are not sufficient on their own. Murray and colleagues noted a 30-fold variation in mortality across communities during the pandemic which they attribute to 'individual and host community factors' (Murray et al. 2006).

With this in mind, it is time to return to Jane and the consideration of the aims of her treatment which are:

- *To reduce her anxiety and improve cognitive function.*
- *To facilitate natural transition through menopause so that associated symptoms are removed.*
- *To ensure that Jane is aware of the increased risk of osteoporosis and of cardiovascular problems in post-menopausal women and to provide dietary and life-style advice to help to compensate for the increased risk.*
- *To provide relief from a range of distressing symptoms such as night sweats and indigestion.*

Jane's treatment consisted of advice on nutrition and life style and a combination of herbs which are the focus of the discussion that follows.

The herbal treatment involved two preparations containing a total of nine herbs (see table below). These herbs were chosen to because they combined to strengthen her nervous system, reduce her anxiety, improve cognitive function while improving her hormonal balance and alleviating her menopausal and digestive symptoms. Each individual herb has several therapeutic actions. These therapeutic effects have been observed and documented in traditional literature. Many, but not all, of these effects have been validated using scientific methodology either *in vitro* (in a test tube), *in vivo* (in animal studies), in clinical trials, or in a combination of all three.

Preparation	Botanical name	Common name English/Spanish	Therapeutic actions include:
Tincture 7ml morning and night in a little water	<i>Cimicfuga</i>	Black	Hormone balancing
	<i>racemosa</i>	cohosh/Cimicfuga	
	<i>Leonurus cardiaca</i>	Motherwort/ Agripalma	Female tonic, anxiolytic
	<i>Bacopa monieria</i>	Bacopa	Cognition enhancer, anxiolytic
	<i>Rosemarianus officinalis</i>	Rosemary/ Romero	Cognition enhancer, circulatory stimulant, hepatic
	<i>Zizyphus spinosa</i>	Zizyphus/Azufaito	Perspiration control, anxiolytic
Tea One cup to be brewed after each mean	<i>Melissa officinalis</i>	Lemon balm/Melisa Tarungina	Nervous system tonic, carminative, cognition enhancer
	<i>Menthe piperita</i>	Peppermint/Mente	Antispasmodic, carminative
	<i>Glycyrrhiza glabra</i>	Liquorice/Regalis	Anti inflammatory, adrenal tonic
	<i>Avena sativa</i>	Avena/Cirada	Nervous system tonic, soothing effect on the digestive tract

Table 1. Herbal treatment after initial consultation

After 1 month of treatment Jane reported that she felt 'so much better'. She rarely experienced hot flushes by day and was waking less often due to night sweats. The quality of her sleep was improved and she felt more alert and less exhausted and anxious. In addition her bloating and flatulence had resolved. Jane was advised to maintain her herbal regime for the next 3 months and then have another review. Her life-style, diet and herbal prescriptions were modified over the ensuing 12 months. After one year of treatment Jane reported herself to be well and happy. She had established a regular exercise routine and seen a counsellor to work through some issues around her Mother. Her herbal tincture had been simplified and the dose lowered. Jane occasionally used the herb tea in response to stress or if her digestive symptoms occurred. She felt her memory had improved and experienced no menopausal symptoms while she continued on the herbs, although occasional mild hot flushes did return if she stopped the herbs completely. Jane had also contributed several works to a regional art gallery.

Synergy: more than the sum of its parts

While the restoration of vitality remains as central to herbal philosophy as in previous eras, the *materia medica* available to herbalists in Australia has changed. The addition of herbs from other therapeutic systems was discussed in the previous sections. It is interesting to note that the majority of the herbs in the above prescription have been used in Europe for centuries, others have joined the Western herbal *materia medica* more recently: Black cohosh used therapeutically by Indigenous North Americans, Zizyphus from Traditional Chinese Medicine and Bacopa from Ayurveda. The content of the *materia medica* used in Western herbalism has also changed due to government regulations, although the specifics vary with jurisdiction. Many of the toxic plants used in traditional herbal medicine are no longer legally available to practitioners of Western herbal medicine. On many occasions the powerful constituents that caused their toxicity have been extracted and developed into pharmaceutical preparations, where accurately metered doses allow are required for their safer use.

One of the distinctions between pharmaceutical medicines and herbs is that pharmaceuticals typically contain just one physiologically-active chemical, frequently a synthetic version of an original plant constituent (Griffin & O'Grady 2006). Herbal medicines, in contrast, have enormous intrinsic biological and pharmacological complexity. *Hypericum perforatum* (St John's Wort or Hipérico/Hierba de San Juan) is one of the best studied herbs in Western herbal medicine. Numerous clinical trials have demonstrated that St John's Wort is as effective as several classes of pharmaceutical antidepressants for mild and moderate depression and produces fewer side effects (Linde, Berner, & Kriston 2008). Analysis of the herb has so far revealed nine plant constituents each contributing to the therapeutic effect; seven constituents having antidepressant actions and two improving the uptake of the other seven (Butterweck et al. 2003). Herbalists view this as an example of the synergy of constituents.

Synergy is a term used to describe aspects of complex changing relationships in physics, biology, economics and epistemology and is variously defined according to the discipline in which the synergy is postulated or observed. Each definition identifies three components; firstly a dynamic state, secondly, many elements whose action can be

individually described and finally, the observation that the system involving all these well described elements produces different and greater effects than could be predicted by the understanding of the elements (Corning 1998).

Herbalists argue that a judiciously selected combination of herbs will act to restore health more effectively than would be predicted from the individual herbs acting alone. The truth of this assertion cannot be tested using the biomedical approach in the case of an individual patient and individual treatment; however simplified versions have been explored using clinical trial methodology. For example, Koetter et al. investigated the effect of two well known herbs on insomnia (Koetter, Schrader, Käufeler, & Brattström 2007). The herbs were *Valeriana officinalis* (Valerian, Valeriana) and *Humulus lupulus* (Hops, Lupulo). The sedative action of both is well described in traditional herbal literature, observed in contemporary clinical experience and supported by some biochemical evidence (Schellenberg, Sauer, Abourashed, Koettter, & Brattström 2004). In this study participating insomniacs were divided into three groups and given either Valerian alone, or Valerian combined with Hops or a placebo. Only the group taking the combination of both herbs reported significantly improved sleep. This surprising result was investigated further and *in vitro* studies demonstrated that Hops improved the biochemical effect of Valerian at two receptor sites known to mediate sleep induction (Koetter et al. 2007). This study is significant since it provides proof of the concept of synergy between herbs. This is particularly important since as clinical trials prove the efficacy of individual herbs in the treatment of specific conditions there is a tendency to apply the reductionist logic of biomedicine to herbal prescribing (Saw Palmeto for Benign Prostatic Enlargement, St John's Wort for depression, Black Cohosh for menopause etc).

The strengths of the biomedical model can be witnessed in emergency medicine, acute infectious conditions and traumatic injuries. The emergence of new infections (HIV/AIDS, Legionnaires etc.), the rise and re-emergence of old infections (tuberculosis) together with the alarming incidence of iatrogenic illness (that is sicknesses resulting from pharmaceutical medications) and the lack of substantial progress in chronic disease suggest that 'the magic bullet' does not meet all targets (ECH, 2004; Kohn, Corrigan, & Donaldson 2001). Many advocate a more comprehensive approach to health (ECH 2004; Foladori 2005; Kohn et al. 2001).

The philosophy of herbalism and the knowledge of the therapeutic potential of individual plants derive from a strong connection with the natural world. No matter where or how we live, we are still of that world. The assumptions about health and healing that acknowledge the complexity of human systems placing health in a broad and dynamic context reflect individual experience of health and of disease more accurately than the biomedical model. The scientific method provides extremely valuable information, not least in the validation of the traditional usage of many herbs. However the philosophy that drives Western herbal medicine, in the view of the authors—all herbalists themselves—offers something different, something more. By utilising complex systems found within each individual herb as well as the synergy that occurs between herbs in therapeutic formulae, herbalists trained in Western herbal medicine retain their holistic philosophy and view health and sickness as an individual dynamic response to stressors whether pathogenic, environmental or emotional, determined in part by constitutional strengths and susceptibilities, and influenced by multiple psychosocial factors.

Conclusion

There are currently attempts, particularly by those who promote integrative medicine, to bring herbal medicine and biomedicine together to facilitate optimal patient outcomes. The challenge here is to use the tension between biomedicine and herbal medicine, and between science and tradition, creatively. Western science has developed a sophisticated analytic perspective, which may be wonderfully complemented by traditional knowledge with its holistic viewpoint and focus on connections and synergies. However, the politics of healthcare cannot be ignored: the West has valorised science over tradition since the Enlightenment, and power and influence remains associated with the former rather than the latter.

There is no denying the eclipse of herbal medicine during much of the 20th century, nor its more recent popularity which shows no sign of abating. However, the form of its future within Australian healthcare is unclear—will individual herbs be incorporated into the armoury of biomedicine, appropriated by medical doctors, and traditional approaches and perspectives on patients disappear? Or will herbalists achieve their longstanding goal of statutory regulation and use this to establish a thriving profession in which they can contribute their skills and knowledge alongside those of other healthcare practitioners?

We have demonstrated that herbal medicine is complex, and utilises the complexity of the plants to facilitate healing in the complex systems that are individual patients. We have also demonstrated that herbalists provide a perspective on healthcare that complements current approaches. Given the parlous state of the Australian healthcare system, with costs spiralling out of control and chronic disease exploding, we suggest that the cost-effective, gentle, yet often powerful interventions provided by herbalists should be prioritised for inclusion in Australian healthcare.

Works Cited

- (1858). Parliamentary Debates.
- (1990). “70th Anniversary Celebrations Report.” *Australian Journal of Medical Herbalism* 2(4): 79.
- Australian Institute of Health and Welfare (AIHW), *Australia's Health (2010), the 12th biennial health report*.
- Bensoussan, A., S. Myers, et al. (2005). “Risks associated with the practice of naturopathy and western herbal medicine”. *The Practice and Regulatory Requirements of Naturopathy and Western Herbal Medicine*. V. Lin, A. Bensoussan, S. Myers et al. Melbourne: School of Public Health, LaTrobe University.
- Bhattacharya, S.K., Bhattacharya, A., Kumar, A., & Ghosal, S. (2000). “Antioxidant activity of Bacopa monniera in rat frontal cortex, striatum and hippocampus.” *Phytotherapy Research* 14(3), 174-179.

- Bhattacharya, S.K., Kumar, A., & Ghosal, S. (1999). "Effect of Bacopa monniera on animal models of Alzheimer's disease and perturbed central cholinergic markers of cognition in rats". *Research Communications in Pharmacology and Toxicology* 4(3 & 4): ii1-ii12.
- Burnham Institute for Medical Research (2007). "Rosemary Chicken Protects Your Brain From Free Radicals". *ScienceDaily*. Retrieved November 2, 2009, from <http://www.sciencedaily.com/releases/2007/10/071030102210.htm>
- Butterweck, V., Christoffel, V., Nahrstedt, A., Petereit, F., Spengler, B., & Winterhoff, H. (2003). "Step by step removal of hyperforin and hypericin: activity profile of different Hypericum preparations in behavioral models". *Life Science* 73(5): 627-639.
- Calabrese, C., Gregory, W., Leo, M., Kraemer, D., Bone, K., & Oken, B. (2008), "Effects of a standardized Bacopa monnieri extract on cognitive performance, anxiety and depression in the elderly: a randomized, double-blind, placebo-controlled trial". *The Journal of Alternative and Complementary Medicine* 14(6): 707-713.
- Casey, M., J. Adams, et al. (2007). "An examination of the prescription and dispensing of medicines by Western herbal therapists: A national survey in Australia". *Complementary Therapies in Medicine* 15: 13-20.
- Cordell, G. (2004). "Plants in Drug Discovery-Creating a New Vision". Tan, BKH, Zhu, Y-K, Bay, B-H (Eds.). *Novel Compounds from Natural Products in the New Millenium: Potential and Challenges*. Singapore: World Scientific Publishing Company: 1-19.
- Corning, P. A. (1998). "'The synergism hypothesis': On the concept of synergy and its role in the evolution of complex systems". *Journal of Social and Evolutionary Systems* 21(2).
- Crook, T.H., Feher, E.P., & Larrabee, G.J. (1992). "Assessment of memory complaints in age-associated memory impairment: the MAC-Q". *International Journal of Psychogeriatrics* 4: 165-176.
- Culpeper, N. (1638). *Culpepers Complete Herbal*. London: W Foulsham & Co., Ltd.
- Das, G.S., Nath, C., Pal, R., Singh, S., & Singh, H. (2002). "A comparative study in rodents of standardized extracts of Bacopa monniera and Gingko biloba anticholinesterase and cognitive enhancing activities". *Pharmacology, Biochemistry and Behaviour* 73: 893-900.
- Dey, C. D., Koley, P. N., & Dutta, C. P. (1964). "Chemical and pharmacological properties of Brahmi". *Journal of Experimental Medical Sciences* 8(1): 1-13.
- Dunbar, R. (1995). *The Trouble with Science*. London: Faber and Faber.
- Etter, S. (2004). "Rosmarinus officinalis as an antioxidant." *Journal of Herbs, Spices & Medicinal plants* 11(1-2): 121-159.
- European Committee for Homeopathy. (2004). *Towards another model of health and disease*.
- Evans, S. (2009). "Challenge, tension and possibility: an exploration into contemporary Western herbal medicine in Australia". Lismore, Southern Cross University. PhD.

- Foladori, G. (2005). "The Challenge of Infectious Diseases to the Biomedical Paradigm". *Bulletin of Science, Technology & Society* 25(2): 145-158.
- Frost, A. (1993). "Sir Joseph Banks and the transfer of plants to and from the South Pacific 1786-1798". Melbourne, Colony Press.
- Gordon, M. H. & Kourimska, L. (1995). "The effects of antioxidants on changes in oils during heating and deep frying". *Journal of the Science of Food and Agriculture* 68: 347-353.
- Grieve, M. (1931). *A Modern Herbal*. London: Tiger Books International.
- Griffin, J. P. & O'Grady, J. (Eds.) (2006). *The Textbook of Pharmaceutical Medicine*. Oxford: Blackwell.
- Jagtenberg, T. & S. Evans (2003). "Global Herbal Medicine: a Critique". *Journal of Alternative and Complementary Medicine* 9(2): 321-329.
- Kawas, C.H. (2003). "Early Alzheimer's disease". *New England Journal of Medicine* 349(11): 1056-1063.
- Kishore, M. & Singh, M. (2005). "Effect of bacosides, alcoholic extract of *Bacopa monniera* Linn. (brahmi), on experimental amnesia in mice". *Indian Journal of Experimental Biology* 43(7): 640-645.
- Koetter, U., Schrader, E., Käufeler, R. & Brattström, A. (2007). "A Randomized, Double Blind, Placebo-Controlled, Prospective Clinical Study to Demonstrate Clinical Efficacy of a Fixed Valerian Hops Extract Combination (Ze 91019) in Patients Suffering from Non-Organic Sleep Disorder". *Phytotherapy Research* 21: 847-851.
- Kohn, L., Corrigan, J. & Donaldson, M. (Eds.) (2001). *To err is human: building a safer health system*. Washington DC: National Academy Press.
- Lin, V., A. Bensoussan, et al. (2005). *The Practice and Regulatory Requirements of Naturopathy and Western Herbal Medicine*. Melbourne: La Trobe University.
- Linde, K., Berner, M. & Kriston, L. (2008). "St John's wort for major depression". *Cochrane Database of Systematic Reviews* 4(CD000448).
- Lipton, S. (2007). "Pathologically activated therapeutics for neuroprotection". *Nature Reviews Neuroscience* 8: 803-808.
- Lyng, S. (2010). "Reflexive biomedicalization and alternative healing systems". *Journal of Bioethical Inquiry* 7(1).
- Lyotard, J.F. (1997). *The Postmodern Condition, a report on knowledge*. Manchester: Manchester University Press.
- MacPherson, J. (1927). "Dennis Conisden, Assistant Surgeon of the First Fleet". *MJA*: 770-773.
- McCabe, P. (2005). "Tertiary Education in Naturopathy and Western Herbal Medicine". *The Practice and Regulatory Requirements of Naturopathy and Western Herbal Medicine*. V. Lin, A. Bensoussan, S. Myers et al. Melbourne: School of Public Health, La Trobe University.
- Millenson, J. R. (1995). *Mind Matters: Psychological Medicine in Holistic Practice*. Seattle: Eastland Press.
- Morgan, A. & Stevens, J. (2010). "Does *Bacopa monnieri* Improve Memory Performance in Older Persons? Results of a Randomized, Placebo-Controlled,

- Double-Blind Trial". *Journal of Alternative and Complementary Medicine* 16(7): 753-759.
- Moss, M., Cook, J., Wesnes, K., Duckett, P. (2003). "Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults." *International Journal of Neurosciences* 113(1): 15-38.
- Murray, C. J. L., Lopez, A. D., Chin, B., Feehan, D. & Hill, K. H. (2006). "Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918–20 pandemic: a quantitative analysis". *Lancet* 368: 2211–2218.
- Negi, K.S., Singh, Y.D., Kushwaha, K. P., Rastogi, C. K., Rathi, A. K., Srivastava, J. S. et al. (2000). "Clinical evaluation of memory enhancing properties of Memory Plus in children with attention deficit hyperactivity disorder". *Indian Journal of Psychiatry* 42, Supplement.
- Osterrieth, P.A. (1944). "Le test de copie d'une figure complex: Contribution a l'etude de la perception et de la memoire". *Archives de Psychologie* 30: 286-340.
- O'Sullivan, C., Ed. (2005). "Reshaping Herbal Medicine: Knowledge, Education and Professional Culture". London: Elsevier.
- Raghav, S., Singh, R., Dalai, P.K., Srivastava, J.S., Asthana, O.P. (2006). "Randomized controlled trial of standardized Bacopa monniera extract in age-associated cognitive impairment". *Indian Journal of Psychiatry* 48: 238-242.
- Reitan, R.M. (1958). "Validity of the Trail Making Test as an indicator of organic brain damage". *Perceptual and Motor Skills* 8: 271-276.
- Rey, A. (1964). *L'examen clinique in psychologie*. Paris: Press Universitaire de France.
- Richheimer, S., Bernart. M., King, G., Kent, M. & Beiley, D. (1996). "Antioxidant activity of lipid-soluble phenolic diterpenes from rosemary". *Journal of the American Oil Chemists' Society* 73(4): 507-514.
- Roodenrys, S., Booth, D., Bulzomi, S., Phipps, A., Micallef, C., & Smoker, J. (2002). "Chronic Effects of Brahmi (Bacopa monnieri) on Human Memory". *Neuropsychopharmacology* 27(2): 279-281.
- Rosner, D. (2010). "'Spanish Flu, or Whatever It Is...' the Paradox of Public Health in a Time of Crisis". *Public Health Reports* 125(supplement 3): 37-47.
- Russo, A., Borrelli, F., Campisi, A., Aquaviva, R., Raciti, G. & Vanella, A. (2003b). "Nitric oxide-related toxicity in cultured astrocytes: effects of Bacopa monniera". *Life Science* 73: 1517-15.
- Russo, A., Izzo, A.A., Borrelli, F., Renis, M. & Vanella, A. (2003a). "Free radical scavenging capacity and protective effect on DNA damage of Bacopa monniera". *Phytotherapy Research* 17: 870-875.
- Sairam, K., Rao, V., Dora Babu, M. & Goel, R.K. (2001). "Prophylactic and curative effects of Bacopa monniera in gastric ulcer models". *Phytomedicine* 8(6): 423-430.
- Saks, M. (2002). "Professionalization, Regulation and Alternative Medicine". Allsop, M.J.S. *Regulating the Health Professions*. London: Sage. 148-159.
- Saks, M. (2003). *Orthodox and Alternative Medicine. Politics, professionalization and health care*. London, Continuum.

- Satoh T, Kosaka K, Itoh K, Kobayashi A, Yamamoto M, Shimojo Y, Kitajima C, Cui J, Kamins J, Okamoto S, Izumi M, Shirasawa T, Lipton SA. (2008) "Carnosic acid, a catechol-type electrophilic compound, protects neurons both in vitro and in vivo through activation of the Keap1/Nrf2 pathway via S-alkylation of targeted cysteines on Keap1". *Journal of Neurochemistry* 104(4): 1116-1131.
- Schellenberg, R., Sauer, S., Abourashed, E., Koettter, U. & Brattström, A. (2004). "The fixed combination of valerian and hops (Ze91019) acts via a central adenosine mechanism". *Planta Medica* 70: 5994-5597.
- Sharma, U. (2000). "Medical Pluralism and the Future of CAM". B.M.W. Kelner. *Complementary and Alternative Medicine: Challenge and Change*. Amsterdam: Harwood Academic Publishers. 211-222.
- Siahpush, M. (1998). "Post-modern values, dissatisfaction with conventional medicine and popularity of alternative therapies." *Journal of Sociology* 34(1): 58-70.
- Sigerist, H. (1961). *The History of Medicine* (Vol. 2). Oxford: Oxford University Press.
- Singh, H.K. & Dhawan, B.N. (1982). "Effect of Bacopa monniera Linn. (Brahmi) extract on avoidance responses in rats". *Journal of Ethnopharmacology* 5: 205-214.
- Singh, H.K. & Dhawan, B.N. (1997). "Neuropsychopharmacological effects of the Ayurvedic nootropic Bacopa monniera linn. (brahmi)". *Indian Journal of Pharmacology* 29: s359-s365.
- Stough, C., Lloyd, J., Clarke, J., Downey, L.A., Hutchison, C.W., Rodgers, T., et al. (2001). "The chronic effects of an extract of Bacopa monniera (Brahmi) on cognitive function in healthy human subjects". *Psychopharmacology* 156(4): 481-484.
- Sumathy, T., Subramanian, S., Govindasamy, S., Balakrishna, K. & Veluchamy, G. (2001). "Protective effect of Bacopa monniera on morphine induced hepatotoxicity in rats". *Phytotherapy Research* 15: 643-645.
- Sumathy, T.S., Govindasamy, S., Balakrishna, K. & Veluchamy, G. (2002). "Protective role of Bacopa monniera on morphine- induced brain mitochondrial enzyme activity in rats". *Fitoterapia* 73: 381-385.
- Tripathi, Y.B., Chaurasia, S., Tripathi, E., Upadhyay, A. & Dubey, G.P. (1996). "Bacopa monniera Linn. as an antioxidant: mechanism of action". *Indian Journal of Experimental Biology* 34(6): 523-526.
- University of Arkansas, Food Safety Consortium (2008). "To block the carcinogens, add a touch of rosemary when grilling meats". *ScienceDaily*. Retrieved November 2, 2009, from <http://www.sciencedaily.com/>
- Willis, E. (1989). *Medical Dominance*. Sydney, Allen and Unwin.
- Woodhouse, M. B. (1997). "The concept of disease in alternative medicine". J. M. Humber & R. F. Almeder (Eds.) *What is disease? Biomedical Ethics Reviews* Totowa, New Jersey USA: Human Press.
- Xue, C., A. Zhang, et al. (2007). "Complementary and Alternative Medicine Use in Australia: a national population-based survey". *Journal of Alternative and Complementary Medicine* 13(6): 643-650.

Cathy Avila: PhD (SCU) BSc (Hons) Exeter, ND. Cathy lectures in Homeopathy and Research Methodology in the School of Health and Human Science of Southern Cross University in Australia. She is a member of a team investigating the effect of herbal and nutritional formulas on pain and quality of life in people suffering from osteoarthritis. Her doctoral research included clinical trials investigating nutritional supplementation as a method of reducing premenstrual symptoms. Cathy's current research interests focus on the assessment of clinical naturopathic outcomes from mixed modality treatments.

Sue Evans: PhD (SCU), BA (LaTrobe), Dip Ed (LaTrobe). In both her teaching and research through the School of Health and Human Sciences, Southern Cross University, Sue's particular interest is to articulate the contemporary relevance of herbal medicine's long history and rich philosophy to clinical practice. Her PhD considered the complex nature of contemporary Western herbal practice, and the professional challenges faced by Australian herbalists. Recent publications have concerned the changes to the knowledge base of Western herbal medicine, and the problems associated with the globalisation of herbal medicine.

Annette Morgan: MSc (SCU), BN (SCU), ND, DBM. Annette lectures in clinical units at the School of Health and Human Sciences, Southern Cross University, and holds qualifications in Naturopathy and Herbal Medicine, as well as Bachelor of Nursing and Master of Science degrees. She has worked in the naturopathic profession in various contexts for over twenty years: in private naturopathic clinical practice; in the natural medicine industry; and in naturopathic education. Her MSc thesis, published in 2006, investigated the effects of *Bacopa monnieri* on memory performance in older persons. She has a particular interest in the application of botanical and nutritional approaches to optimising the integrity and function of the brain and nervous system.

ⁱ Naturopathy in Australia includes the disciplines of Western herbal medicine, nutrition, homeopathy and tactile therapies (massage). Thus herbal medicine in Australia may be practiced as a stand-alone therapy, or as part of naturopathy.