Monastic medicine: medieval herbalism meets modern science

A group of German researchers is bringing to light the medicinal wisdom of the Middle Ages.

By Susan Watt and Eleanor Hayes

Most people think of herbal medicine as a distinctly ‘alternative’ option – something that you might try for a cough or cold that won’t budge, but not for life-threatening illnesses. Medical historian Dr Johannes Mayer, however, takes it all much more seriously: he believes that the herbal remedies described in medieval texts can provide excellent starting points for highly effective modern treatments, even for diseases such as cancer. And he is not alone, as his work has already attracted the attention (and funding!) of pharmaceutical giant GlaxoSmithKline.
The focus for Dr Mayer’s research group at the University of Würzburg, Germany, is monastic medicine (Klostermedizin in German). For the past 30 years, group members have been sifting through monastic manuscripts dating from the 8th century onwards, translating and publishing details of plant remedies and the ailments that they are intended to treat.

Their work moved from the historical towards the more scientific some 14 years ago, when the group received a visit from a manager at GlaxoSmithKline. When the visitor asked “What is monastic medicine? Is it praying or something?”, Dr Mayer explained that in fact it meant elucidating the herbal treatments documented by monasteries and investigating their physiological effects.

That visit led to a research group being established at the university, with sponsorship from GlaxoSmithKline, to look for effective modern remedies derived from medieval monastic knowledge. So far the collaboration has led to the development of some products to treat the common cold,
Some of these ingredients are then tested in laboratories at Würzburg University Hospital or at their partner pharmaceutical companies. For example, scientists in the ear, nose and throat department at the hospital are currently testing the effect of water- and alcohol-based extracts of Salvia officinalis (old world royal fern) and Salvia officinalis, a type of sage, is mentioned in medieval manuscripts as being useful for improving memory. Recent research at the University of Newcastle, UK, has shown it to be effective in this role (it appears to help reduce the breakdown of the neurotransmitter acetylcholine), which makes it a candidate for the development of a treatment for dementia (Scholey et al., 2008). Drug development and clinical trials take time, however, so Dr Mayer expects it will be another ten years before a drug based on sage becomes available.

Ten years ago, the Klostermedizin research group started a project together with Abtei to investigate the active ingredients and mechanisms by which hops (Humulus lupulus) and valerian (Valeriana officinalis) work as sedatives (see, for example, Schellenberg et al., 2004). They found that the lignans in hops function similarly to adenosine, an inhibitory neurotransmitter that promotes sleep. Hops work in a similar way to the hormone melatonin, which plays a role in the body clock.

Salvia officinalis, a type of sage, is mentioned in medieval manuscripts as being useful for improving memory. Recent research at the University of Newcastle, UK, has shown it to be effective in this role (it appears to help reduce the breakdown of the neurotransmitter acetylcholine), which makes it a candidate for the development of a treatment for dementia (Scholey et al., 2008). Drug development and clinical trials take time, however, so Dr Mayer expects it will be another ten years before a drug based on sage becomes available.

Ten years ago, the Klostermedizin research group started a project together with Abtei to investigate the active ingredients and mechanisms by which hops (Humulus lupulus) and valerian (Valeriana officinalis) work as sedatives (see, for example, Schellenberg et al., 2004). They found that the lignans in hops function similarly to adenosine, an inhibitory neurotransmitter that promotes sleep. Hops work in a similar way to the hormone melatonin, which plays a role in the body clock.

Salvia officinalis, a type of sage, is mentioned in medieval manuscripts as being useful for improving memory. Recent research at the University of Newcastle, UK, has shown it to be effective in this role (it appears to help reduce the breakdown of the neurotransmitter acetylcholine), which makes it a candidate for the development of a treatment for dementia (Scholey et al., 2008). Drug development and clinical trials take time, however, so Dr Mayer expects it will be another ten years before a drug based on sage becomes available.

Ten years ago, the Klostermedizin research group started a project together with Abtei to investigate the active ingredients and mechanisms by which hops (Humulus lupulus) and valerian (Valeriana officinalis) work as sedatives (see, for example, Schellenberg et al., 2004). They found that the lignans in hops function similarly to adenosine, an inhibitory neurotransmitter that promotes sleep. Hops work in a similar way to the hormone melatonin, which plays a role in the body clock.

Salvia officinalis, a type of sage, is mentioned in medieval manuscripts as being useful for improving memory. Recent research at the University of Newcastle, UK, has shown it to be effective in this role (it appears to help reduce the breakdown of the neurotransmitter acetylcholine), which makes it a candidate for the development of a treatment for dementia (Scholey et al., 2008). Drug development and clinical trials take time, however, so Dr Mayer expects it will be another ten years before a drug based on sage becomes available.

Ten years ago, the Klostermedizin research group started a project together with Abtei to investigate the active ingredients and mechanisms by which hops (Humulus lupulus) and valerian (Valeriana officinalis) work as sedatives (see, for example, Schellenberg et al., 2004). They found that the lignans in hops function similarly to adenosine, an inhibitory neurotransmitter that promotes sleep. Hops work in a similar way to the hormone melatonin, which plays a role in the body clock.

Salvia officinalis, a type of sage, is mentioned in medieval manuscripts as being useful for improving memory. Recent research at the University of Newcastle, UK, has shown it to be effective in this role (it appears to help reduce the breakdown of the neurotransmitter acetylcholine), which makes it a candidate for the development of a treatment for dementia (Scholey et al., 2008). Drug development and clinical trials take time, however, so Dr Mayer expects it will be another ten years before a drug based on sage becomes available.
**Reliable remedies**

Although many plants have been used traditionally in medicine, few have been investigated scientifically to find out whether they are indeed safe and effective remedies for the conditions they are said to treat. In addition to laboratory studies, such as those carried out by Dr Mayer’s group, the clinical efficacy of a treatment also needs to be tested.

Scientists agree that the best way to find out the effect of a treatment is via a high-quality clinical trial, or RCT (randomised controlled trial). These include several precautions to make sure the trial results are free from bias:

- The treatment being studied is compared to one or more alternative *control* treatments, including a placebo (one that has no direct pharmacological effect, such as a sugar pill).
- Participants in the trial are randomly assigned to the different treatments.
- Neither the patients themselves, nor the people giving them the treatment, know which treatment each has been given; this is called *double-blinding*.
- The trial needs to have enough people taking part so that the results could not easily have occurred by chance (the more data there is, the less likely this is to happen).

While this all may seem very complicated, without these precautions the results could easily be due to factors other than the treatment itself, so they would not be reliable. Even when a high-quality study has been done, the results need to be examined alongside those from other such trials to see what the total evidence suggests. (To learn more about clinical trials, see Garner & Thomas, 2010, and Brown, 2011.)

Herbal treatments that are supported by good-quality evidence include these:

- *Artichoke* (*Cynara scolymus*) can aid digestive problems as it increases the flow of bile, which helps to digest fats. See *The Handbook of Clinically Tested Herbal Remedies*\(^1\) for evidence.

- *Cranberry* (*Vaccinium macrocarpon*) may help prevent urinary tract infections: drinking cranberry juice is thought to make bacteria less able to adhere to walls of the urinary tract. (However, a recent evidence review concluded cranberry is less effective than previously thought.) See the Cochrane Collaboration website\(^2\) for evidence.

- *St. John’s wort* (*Hypericum perforatum*) is as effective in treating depression as some pharmaceutical antidepressants, but like them it can also have side effects. See *The Handbook of Clinically Tested Herbal Remedies*\(^1\) for evidence.
Chelidonium majus (greater celandine) on cultures of ear cancer cells. Finally, a few promising leads have been passed on for development as potential new drugs, undergoing clinical trials and other testing to conform to legislative requirements. If the fern and celandine extracts prove effective, for example, the clinical trials will be carried out at the hospital.

This complex process is reflected in the multidisciplinary expertise of Dr Mayer’s team, which comprises academics from a variety of backgrounds: historians of medicine and scholars of Latin and ancient Greek, plus chemists, biologists and pharmacists – all of whom are needed to fully understand the medieval recipes. There are also outside specialists that the group can call on – including a Cistercian monk who is a biologist.

Dr Mayer’s own background is in history. “I first studied history, and then the history of medicine and that’s how I found out that we didn’t know what plants they really were using in the Middle Ages. So I started to make a database about historical plants used in Europe,” he says.

Although most of the key texts are written in Latin, in many cases this is a translation from earlier texts written in Arabic, some of which also contain
Hildegard of Bingen (1098-1179) was an influential Benedictine abbess who wrote botanical and medicinal texts, as well as theological manuscripts and beautiful liturgical music. She is shown here, in a miniature from the Rupertsberger Codex des Liber Scivias, being inspired by God.


One of the best resources to find out about the efficacy of medicines of all kinds is the Cochrane Collaboration website. The Cochrane Collaboration produces reviews of clinical trials data to establish whether there is good evidence that a treatment is effective. The reviews can be accessed via the Cochrane website.

Another resource is The Handbook of Clinically Tested Herbal Remedies by Marilyn Barrett (2004), which can also be accessed online. The author has compiled evidence from trials of more than 30 commonly used herbal remedies, together with reviews of each trial and a rating of the quality of the evidence that each provides (graded I, II or III).

References


Web references

To learn more about Arabic science and medicine between the 7th and 17th centuries, see:
www.scienceinschool.org/2006/issue3/missing

To learn more about the work of Dr Mayer’s research group, visit the Forscherguppe Klostermedizin website (in German):
www.klostermedizin.de

If you found this article interesting, why not browse the other science topics in Science in School: www.scienceinschool.org/sciencetopics

Monasteries such as the Cistercian abbey of Maulbronn, in southern Germany, preserved and transmitted important knowledge about herbal medicine in the Middle Ages.

Resources
The Science and Plants for Schools website offers a teaching resource about medicines and drugs from plants. Using a card-game format, the activity is suitable for teaching students aged 16+ about plant-derived pharmaceuticals, or it could be used to introduce younger students to poisons. See www.saps.org.uk or use the direct link: http://tinyurl.com/cnc4zw8

w2 – The Cochrane Collaboration produces reviews of clinical trials data, including trials of herbal medicines, which can be accessed via the Cochrane website. www.cochrane.org/cochrane-reviews

The most recent review of evidence for the effectiveness of cranberries in the prevention of urinary tract infections showed no significant benefit. http://summaries.cochrane.org/CD001321

Susan Watt is a freelance science writer and editor. She studied natural sciences at the University of Cambridge, UK, and also holds degrees in philosophy and experimental psychology. She has worked for the Science Museum, London, and the British Council, as well as for many publishers. Her special interests are in the history and philosophy of science and in science education.

Dr Eleanor Hayes is the editor-in-chief of Science in School. She studied zoology at the University of Oxford, UK, and completed a PhD in insect ecology. She then spent some time working in university administration before moving to Germany and into science publishing in 2001. In 2005, she moved to the European Molecular Biology Laboratory to launch Science in School.

Images courtesy of WeiterWinkel / Flickr