

# Molecular Medicine

## Editors-in-Chief

Kevin J Tracey, MD  
The Feinstein Institute for Medical Research  
Manhasset, NY, USA

Anthony Cerami, PhD  
Kenneth S Warren Laboratories  
Tarrytown, NY, USA

## Editorial Staff

Christopher J Czura  
Managing Editor  
The Feinstein Institute for Medical Research  
Manhasset, NY, USA

Margot Gallowitsch-Puerta  
Associate Editor  
The Feinstein Institute for Medical Research  
Manhasset, NY, USA

## *Mollie Medcast*

Episode 9 Transcript: Garlic, Maggots, Wolfsbane

Hello and welcome back to another episode “Mollie Medcast,” the podcast for the biomedical journal, *Molecular Medicine*. My name is Margot Gallowitsch-Puerta and I’ll be your host for this special Halloween Episode where we’ll talk about medicinal and historical uses of garlic, maggots and wolfsbane. But be careful because “by the pricking of my thumbs, something wicked this way comes.”<sup>1</sup>

The first topic we’re going to discuss in this episode is...

### **Garlic**

In Ancient Egypt *Allium sativum*, or garlic, was given mainly to the working class involved in heavy labor, doing things like building the pyramids.<sup>2</sup> It was thought that garlic could maintain and increase the strength of the workers which would allow them to work longer and harder. The Egyptian Codex Ebers, also called the Ebers Papyrus, is the oldest preserved medical document dating from about 1552 B.C. It is one of the most complete records of Egyptian medicine<sup>3</sup> and it’s worth segueing to this for just a moment. The Codex Ebers contains magical formulas, 700 of them, for curing a range of diseases. Some of the topics covered are intestinal disease, ophthalmology, dermatology, gynecology and obstetrics, dentistry, as well as surgical treatment of abscesses, tumors, fractures and burns. There is even a section which deals with what we now call depression. The Codex Ebers identified garlic as a treatment for circulation disorders, malaise and insect and parasite infestations. Greek athletes ate garlic before they competed in Olympic Games and Hippocrates, the father of medicine, used garlic to treat maladies such as pulmonary disease and abdominal growths. The use of garlic is carried on with the Romans. They used garlic for strength building and endurance and they also gave it to soldiers and sailors. If you do a search for this “stinking rose” in Pubmed, over 2700 papers come up dealing with garlic. They include a range of topics including atherosclerosis, ischemia-reperfusion injury, fatigue, cancer, diabetes, metabolism, respiratory disorders, Alzheimer’s disease; the list goes on and on. Here at *Molecular Medicine* we published a paper in our July/August 2007 issue which showed the promising nature of an active component of garlic, liposomized diallyl sulfide, in controlling skin papilloma.<sup>4</sup> So all of this information shows us that throughout history people have harnessed the healing potential of garlic. What is different now, however, is that we have a molecular box of tricks available to us, which allows us to investigate the therapeutic potential of garlic in a way that past societies have been unable to do. This may open the door for the use of garlic in the treatment and prevention of numerous diseases.

The next topic up in my Halloween bag of tricks is...

### **Maggots**

About five million Americans suffer from non-healing wounds due in large part to diabetes and spinal cord injury.<sup>5</sup> It can take several years and numerous types of treatment before a wound actually heals. Although unconventional, the use of maggots has shown beneficial effects in non-healing wounds.<sup>6</sup> While only recently approved by the FDA as a medical device, the use of maggots in wounds is not a new therapy. Napoleon’s battlefield surgeon noticed that wounds containing maggots healed better and were not infected and American Civil War surgeons noticed similar effects. The idea of maggot therapy grew and was used in hundreds of hospitals in the US and Canada until the advent of antibiotics and the mass production of penicillin made the wriggling, writhing therapy of maggots less necessary. Maggots, which are fly larvae, have beneficial effects on cleans-

ing and disinfection of wounds, accelerating wound healing, as well as on debridement, which is the removal of cellular debris and necrotic tissue from the wound bed. Myiasis is the ability of larvae to infest living vertebrate hosts and maggot debridement therapy (MDT) is a controlled myiasis overseen by medical staff. Not all fly larvae can be used in maggot debridement therapy. It's necessary to use a species of larvae that feeds on mainly necrotic tissue, as opposed to those species that can feed on living tissue. Maggots are chemically sterilized, applied to the wound, covered with gauze and allowed to feed for a period of time, usually about two days. The size of the wound will determine how many maggots will be needed and how many rounds of maggot therapy will be necessary.<sup>7</sup> The maggots secrete proteolytic enzymes that liquefy the host tissue as a type of predigestion. The maggots then suck up the soupy necrotic cocktail until they have had enough. A physician removes the gauze and rinses the full, plump maggots from the wound. Maggots debride wounds quickly and effectively without damage to viable tissue. In fact, there have been a few studies which show that maggot debridement therapy was more effective in chronic pressure ulcers<sup>8</sup> and in non-healing leg ulcers<sup>9</sup> than conventional treatments. And as if that wasn't enough, not only do maggots dispose of necrotic tissue and stimulate healing, they can also eliminate microorganisms.<sup>6</sup> Wounds can become infected and the majority of infections are polymicrobial. Studies have shown that applying maggots to infected wounds removes the infection. And one of the most dangerous microorganisms which has been in the news a lot lately is called methicillin resistant *Staphylococcus aureus* or MRSA for short. There is data that shows that if you apply maggots to a MRSA-infected wound, the wound is cleared of MRSA and heals normally.<sup>10</sup> What all of this tells us is that even though the idea of using maggots on an open wound is, well, creepy-crawly, there are medical benefits to doing so. But even more interesting is the field investigating the molecular mechanisms and the molecules involved in maggot debridement and disinfection. Results from this work may lead to less invasive and let's face it, less icky options for non-healing infected wounds.

Next up...

### **Wolfsbane**

Since it's Halloween and a full moon, you may want to have some wolfsbane on hand, just in case you run into a werewolf. Where can one find wolfsbane? Well, it grows from the spot where Cerberus' drool fell.<sup>11</sup> Not up on your mythology? Okay, Hercules, our epic hero was driven mad and unfortunately killed his wife and children. As punishment he was given several tasks to complete, the last of which was to enter the Greek underworld and capture the three-headed dog named, Cerberus. Hades, god of the underworld told Hercules he could have the dog as long as Hercules promised not to hurt Cerberus. Hercules complied, strong-armed the dog and brought Cerberus back to earth where his doggie drool landed, spawning the first poisonous plants, among them, wolfsbane.<sup>12</sup> Wolfsbane's genus name is *Aconitum* and there are many, many species of this plant. *Aconitum* grows in mountainous parts of the northern hemisphere and sap from the roots and leaves is quickly absorbed, producing numbness and tingling of the skin. Several species of *Aconitum* been used to tip arrows in hunting and in warfare. Aconitine is a poisonous alkaloid from the aconite species. This neurotoxin opens sodium channels and causes a tingling, which begins in the extremities and spreads to the entire body.<sup>13</sup> There is no cure for an overdose of this alkaloid. Eerily enough it does not affect the cerebrum. This means that if you are poisoned by aconitine your mind will remain clear and you will be aware of everything going on around you, as your respiratory system becomes slowly paralyzed and you asphyxiate.<sup>14</sup> On the up side, various compounds derived from or based on aconitine have been approved in China for chronic pain and rheumatoid arthritis and the mechanism of action is currently being investigated.<sup>15</sup> So there is hope that this werewolf repellent may be transformed into a useful disease treatment.

That's it for this week's special episode of "Mollie Medcast" I hope you enjoyed what we talked about. If you want to find out more about any of these topics you can visit our website, there's a transcript posted and a lot of the references are up there so you can find out more about wolfsbane, or garlic or maggot therapy if you like. If you look at our podcast page you'll see we have a frappr map up there. It's an interactive map and you can go in and put your pin on the map and see where other *Molecular Medicine* readers and podcast listeners are com-

ing from. I'll be giving away an iPod shuffle during the month of October to one of our lucky frappr map members so if you have a second put your pin on the map and you'll automatically be entered to win an iPod shuffle. If you enjoyed listening to the podcast please consider putting a positive review for us in at iTunes. *Molecular Medicine* is published bimonthly by the Feinstein Institute for Medical Research which is located in Manhasset, NY. This is [margot@molmed.org](mailto:margot@molmed.org) as always, thanks for listening.

Written and Produced by Margot Gallowitsch-Puerta

Associate Editor, *Molecular Medicine*

Music: Opuzz.com

Photos: iStock

References:

1. Macbeth iv.i.44-45
2. Rivlin RS. (2001) Historical perspective on the use of garlic. *Journal of Nutrition*. 131:951S-954S.
3. <http://www.whonamedit.com/synd.cfm/443.html>, Accessed October 31, 2007.
4. Khan A et al. (2007) Potential of diallyl sulfide bearing pH-sensitive liposomes in chemoprevention against DMBA-induced skin papilloma. *Mol Med*. 13(7-8):443-451.
5. <http://www.woodlandheights.net/woundcare.htm>, Accessed October 31, 2007.
6. Nigam et al. (2006) Maggot therapy: the science and implication for CAM Part I-history and bacterial resistance. *eCAM*. 3(2):223-227.
7. [http://findarticles.com/p/articles/mi\\_qn4188/is\\_20040803/ai\\_n11467482](http://findarticles.com/p/articles/mi_qn4188/is_20040803/ai_n11467482), Accessed October 31, 2007. Deseret News (Salt Lake City). 2004. Maggots do magic on stubborn wounds. Associated Press.
8. Sherman RA. 2002. Maggot versus conservative debridement therapy for the treatment of pressure ulcers. *Wound Repair Regen*. 10(4):208-214.
9. Cambal M. 2006. Maggot debridement therapy. *Bratisl. Lek Listy*. 107(11-12):442-444.
10. Thomas S, Jones M. (2000) Maggots can benefit patients with MRSA. *Pract Nurse* 20:101-104.
11. <http://en.wikipedia.org/wiki/Wolfsbane>
12. <http://en.wikipedia.org/wiki/Heracles>
13. <http://en.wikipedia.org/wiki/Aconitine>
14. <http://en.wikipedia.org/wiki/Aconitum>
15. Wang et al. (2007) Bulleyaconitine A isolated from aconitum plant displays long-acting local anesthetic properties in vitro and in vivo. *Anesthesiology*. 107(1):82-90.

###