The HERB REPORT: COMFREY

By Kathi Keville, AHA Director

COMFREY, from *Gerard's Herball*, 1597.

Herbalists use comfrey (*Symphytum* spp.) to treat broken bones, tendon damage, gastro-intestinal ulcerations, and lung congestion. Its antiinflammatory and wound-healing properties are documented, and there is also evidence that it modulates the immune system. Comfrey is rich in protein, antioxidants, and vitamin B12. It is found in the diet of some ethnic groups. Comfrey became controversial in the early 1990s when it was associated with several cases of liver (veno-occlusive) disease, due to potentially toxic pyrrolizidine alkaloids (PAs), which are processed by the liver and excreted in urine. When these alkaloids oxidize and bind to proteins, they form pyrroles that can produce symptoms of cirrhosis of the liver. There have also been problems with botanical mis-identification, with other, more toxic plants being substituted for comfrey. The US FDA currently asks companies to voluntarily not sell comfrey products for internal use. Distribution is restricted in Canada, use is limited in Germany to external products, and the UK's Medicine Control Agency lists comfrey with herbs being considered for restriction to prescription only.

However, comfrey might not be as dangerous as restrictions indicate. There has been no new research and no new adverse reactions reported. Most studies use very high quantities of purified PAs—rather than the whole plant—with rodents, but the response varies tremendously depending upon the animal and how the plant is administrated. Along with pigs, chickens, and guinea pigs, rats are easily poisoned by *Senecio* species, whereas mice, sheep and, to some degree, rabbits and guinea pigs are resistant. Yet, a single injection of purified PAs kills rabbits. Pigs and chickens readily eat comfrey with no problems, even when it is 40% of their diet. Toxicity is also influenced by individual health, concurrent use of prescription drugs known to affect the liver, and the quantity and amount consumed. Diet can alter PAs' toxicity. For example, sulfur amino acids (such as the methionine or cysteine in comfrey) decrease formation of toxic metabolites. A good way to assess comfrey's benefits and risks would be to screen individuals who consume it. One such study found only normal blood concentrations of the indicators that signal liver disorder (such as AST, GGT, and bilirubin) in twenty-nine long term comfrey leaf users, even though some had eaten 0.5-25 grams a day for up to 30 years. [Ed. note: comfrey leaves do contain much less PAs than the leaves.]

Not all types of PAs have the same toxicity, and most of the human poisoning from them is due to plants other than comfrey. Macrocyclic di-ester PAs (heliotridine) are found in plants such as *Senecio, Heliotropium,* and *Crotolaria* that have poisoned people worldwide. They are four times more toxic than PA monoesters. They are 2-4 times more so than retronecine esters found in the type of comfrey commonly grown in US gardens (*Symphytum officinale*), 85-97% of which readily hydrolyze into monoesters. The slightly more toxic di-esters are more abundant in the hybrid Russian comfrey *(Symphytum x uplandicum)* (The six other PAs in comfrey are intermedine, lycopsamine, acetyl intermedine, acetyl lycopsamine, symlandine, symphytine, and echimidine.)

Compiled by Kathi Keville, AHA Director, from information presented by Dorena Rode, UC Davis researcher in Rode, D. 2002. *Trends in Pharmacological Sciences* 23:497-9. [Submitted by Rosemary Gladstar, founder of United Plant Savers and Sage Mountain herbal products, Vermont.]

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