

Foxglove among medicinal plants

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When we get sick, most of us don't go into the woods and fields to find cures. However, most medicines did originally come from plants, and quite a few still do.

Aspirin had its origins in meadowsweet and willow trees, morphine and codeine are still derived from poppies, quinine comes from Cinchona trees, and important cancer drugs are derived from yew trees and rosy periwinkle. Foxglove, *Digitalis purpurea*, is another plant used as a source of important medicines.

Foxglove is a beautiful ornamental flowering plant that has also been used as a medicine for hundreds of years. According to Gerard's "Herball", written in 1597, "foxe glove boiled in water or wine, and drunken, doth cut and consume the thicke toughness of grosse and slimie flegme and naughtie humours; it openeth also the stopping of the liver, spleene, and milt and of other inward parts."

Obviously, a lot has changed since that time! However, in modern medicine, foxglove continues to be used to treat heart disease. Digitoxin and digoxin, two important cardiac glycoside medicines that have never been synthesized, are still extracted from foxglove leaves. *Digitalis* is the name of the crude drug. However, a warning — don't eat any part of this poisonous plant! It has medicinal value only at the proper dosage; otherwise foxglove can be fatal.

The story of how foxglove made its way into modern medicine involves a "wise woman in Shropshire" (England), and a physician named William Withering, who in 1785 published "An Account of Foxglove and Some of its Medical uses." The "wise woman" told Withering how she used foxglove leaves to treat "dropsy", a swelling of limbs and torso, which we now know is caused by congestive heart failure.

Withering's study is considered to be a classic in medical literature, because of his precise experiments to determine the correct dosage of foxglove.

Foxglove is native to Europe, has purple to white flowers on a stem a few feet tall, and grows in semi-shade to full sun. However, don't expect flowers in the first year of growth from seed, since

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foxglove is usually a biennial. It produces basal leaves in the first year, and flowers, fruits and seeds in the second year, and then dies.

On a recent trip to British Columbia, Canada, I was surprised to see the bright flowers of foxglove growing along the roadsides as an introduced weed. There is also an annual series of foxgloves, the "Foxy" series.

The common name "foxglove" invites you to imagine a paw neatly inserted into the flower, but may be derived from "folks" (which may refer to fairies) rather than "fox." Similarly, the German common name ("fingerhut") means "thimble", and the scientific name "*Digitalis*" means finger-like. Relatives of foxglove include other attractive flowers such as snapdragon (*Antirrhinum*), turtlehead (*Chelone*) and beardtongue (*Penstemon*), all of which were formerly placed in the snapdragon family *Scrophulariaceae*, and are now in the *Plantaginaceae*.

Now, are you curious about how another widely-used medicine, aspirin, originated and got its name? Meadowsweet *Spiraea* (*Filipendula ulmaria*) contains salicylic acid, and was used by Europeans as a traditional cure for pain and fever. In 1899 the Bayer Co. introduced a new synthetic drug, aspirin, made of acetyl-salicylic acid. The name aspirin was derived from "a" from "acetylated", and "spirin" either from *Spiraea*, or from the German word "spirsäure" meaning salicylic acid.

The name salicylic acid, in turn, is derived from the scientific name for the willow tree, *Salix*. This is for a good reason, as willow is also a source of salicylic acid and was used by Native Americans and Europeans for pain and fever.

Is it surprising that many physicians used to be trained in botany as well as in medicine?

On the campus of Delaware State University, the Claude E. Phillips Herbarium is Delaware's center for research, education, and outreach about plant identifications, locations, and uses. Call 857-6452 (Dr. Susan Yost, Herbarium Educator) to arrange a tour of the herbarium, or for more information about this article.

Delaware State News, Sunday, September 21, 2008



Delaware State University/Susan Yost
Common foxglove (*Digitalis purpurea*), an attractive ornamental, is also the source of important heart medicines.