

Alternative medicine: Not so alternative

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During my summer holiday at the end of my fourth year, as I was tracking the White Rhino in Zimbabwe and spotting exotic birdlife in the Amazon Rainforest of Peru, medicine was the furthest thing from my mind. That was until my guides began to tell me stories of plants and trees that had been used by their indigenous people and Shaman for centuries to treat ailments such as arthritis, impotence, anaemia and even cancer.

I heard accounts of villagers who had been cured of bowel cancer after drinking preparations of *Uña de gato*, and research teams who had patented components isolated from this plant. I decided to learn more about the scientific basis of the therapeutic effects of these medicinal plants.

Uña de gato

Uña de gato is the Spanish name in Peru for *Uncaria tomentosa*, also popularly known as 'Cat's Claw'. It is a woody vine found in the tropical jungles of South and Central America and derives its name from its claw-shaped thorns. *Uña de gato* is traditionally prepared by boiling 20g of root bark with 1L water for 45 minutes. The remaining liquid is then decanted and restored to 1L with additional water. The daily dose is 60ml. The Peruvian communities use its aqueous extract to treat cancer, arthritis, diabetes, and inflammation¹.

The compounds most prominent in *U. tomentosa* are alkaloids and these are responsible for the plants overall medical effects. The alkaloids are found in every part of *U. tomentosa* and stimulate the phagocytic activity of granulocytes and thus act as a stimulant for the immune system when the plant is ingested¹.

Commercially prepared products are available and vary from capsules of dried bark or root extract, to alcoholic tinctures and tea. Krallendorn® is the brand name of a standardised extract of the root of *U. tomentosa* manufactured by Immodal Pharmaka GmbH of Austria. This drug contains pentacyclic oxindole alkaloids that enhance phagocytosis and inhibit proliferation of highly active lymphocytes². Krallendorn® is a prescription drug in Austria available for adjunctive therapy in the treatment of rheumatoid arthritis. A clinical trial of patients with rheumatoid arthritis using Krallendorn® showed that there was modest reduction in the number of patients with painful joints compared to placebo².

Krallendorn® has also been trialled on HIV positive patients³. Thirteen study participants took a daily extract of 20mg *U. tomentosa* root for 2.2 to 5.0 months. After this time the study observed the relative and absolute lymphocyte counts had increased in the participants, however there were no significant changes in the T4/T8 cell ratios. The effect seen has been attributed to the plants ability to induce human endothelial cells to release



Tracking Rhino and a cure for cancer

a lymphocyte-proliferation-regulating factor³.

Tannins and various other phytochemicals have also been isolated from *U. tomentosa* and these have been shown to contribute to the antioxidant properties of the plant via hydroxyl radical scavenging activity¹.

Rooibos

In Zimbabwe I learned about the *Combretaceae* family of shrubs and trees. These plants are locally known by the name Rooibos. Members of this family are widely used in traditional medicines in Africa and Asia to treat disorders such as hepatitis and malaria, respiratory infections, dysentery and uterine cancer:

The most important chemical components isolated from the *Combretaceae* family are the combrestatins⁴. Combretastatin A4 (COA-4), an anti-vascular compound that acts as a tubulin binding protein, is the most active of these compounds. It inhibits tubulin polymerisation and thus prevents cells from producing microtubules⁵. Microtubules are essential to cytoskeleton production, cell movement, and formation of the mitotic spindle used in chromosome segregation and cellular division. COA-4 disrupts the cell's ability to successfully complete cell division and causes a change in shape in vasculature endothelial cells which results in necrosis.

COA-4 targets cells at the tumour 'core' rather than the tumour 'edge', therefore combination therapy with other drugs would be required to treat all parts of a tumour. The effectiveness of this approach has been shown in studies⁶. In July 2007 a Phase III clinical trial was initiated by the pharmaceutical company OXIGENE to evaluate the use of ZYBRESTAT™ which is a phosphorylated form of COA-4. This drug is being used in combination with carboplatin for the treatment of anaplastic thyroid cancer⁷.

Cordoncillo

Cordoncillo is the local name in Peru for *Piper aduncum*. In other parts of South America it is known as 'Matico'. This plant is found in Asia, South America and tropical Latin America. The leaves of *P. aduncum* are traditionally prepared in infusions and decoctions⁸. The main ethnomedical uses of this plant are in treating digestive disorders, as an antiseptic wound healer, and as a haemostat for internal bleeding. Cytotoxic and antiviral activities have also been documented by research⁹.

P. aduncum contains many active chemicals including flavonoids, sesquiterpenes, monoterpenes, alkaloids, and benzenoids¹¹. A group of chemicals called chromenes have been found in the leaves and essential oil of the plant. Chromenes have been found to have cytotoxic effects on cancer cells and bacteria⁹. Benzenoid chemicals found in the plant also demonstrate antibacterial and cytotoxic actions¹⁰.

Despite its potential for medical use, *P. aduncum* is not without its risks. The plant contains small amounts of the chemical compound safrole. Once

widely used as a food additive in root beer, sassafras tea, and other common goods, safrole was barred from use by the Food and Drug Administration in 1964 after it was shown to be mildly carcinogenic¹⁰. Safrole is also a precursor in the production of MDMA (3,4-methylenedioxy-methylamphetamine) or ecstasy¹¹.

DISCUSSION

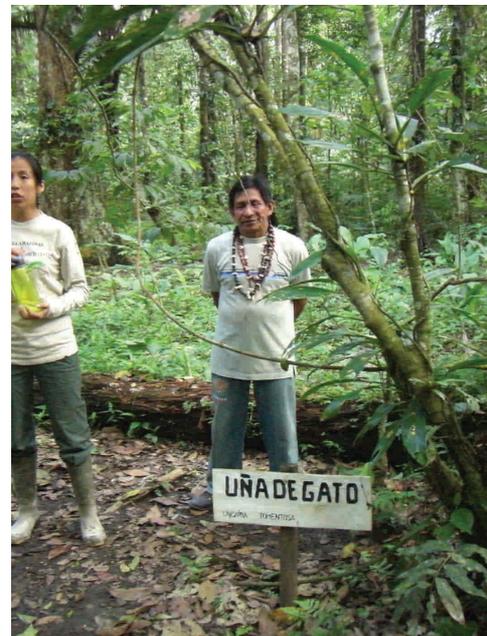
Alternative therapies and the use of herbs and plants for treating sickness is often poorly understood and regarded with much scepticism. Yet many plant therapies are based on sound scientific principles. Fundamentally plants contain chemical components that can either be isolated directly from the plant or synthetically manufactured in the laboratory. Their structure and the mechanism of their therapeutic effect can then be investigated. This acts as a foundation upon which further modifications to the structure and properties can be made with an aim of enhancing effectiveness and reducing side effects.

Conventional and alternative medicines are not necessarily separate streams of therapy. Many treatments and drugs used today have their basis in plant therapies that have been used for centuries by both traditional and non-conventional practitioners. Digoxin is one such example of a modern medicine derived from a plant that was initially used as a herbal remedy. These alternative therapies work because of the science that lies within.

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Shaman and Uña de gato



Map of therapeutic medicines garden in Peru



Tasting medicines in the Shaman laboratory