

## Rooibos and Cancer

The research team working on Rooibos at the Medical Research Council has been investigating the effect of Rooibos on various kinds of cancer for several years. They are working with human cells in the laboratory as well as with live animals, mostly rats and mice. The Programme on Mycotoxins and Experimental Carcinogenesis (PROMEC) is lead by Dr Kareemah Gamielien and Professor Wentzel Gelderblom. Professor Elizabeth Joubert of the Agricultural Research Council's institute Infruitec-Nietvoorbij, Stellenbosch, is a key partner in most of these projects. The SA Rooibos Council as well as CANSA (The Cancer Association of South Africa) contribute to the research funding. Recent and ongoing studies at the MRC include:

### Rooibos and skin cancer

Several studies showed that Rooibos effectively counteracts the development of skin cancer in mice by interfering with the process whereby the cancer develops. In a study of two groups of test mice with induced skin cancer, the one group's skin was topically treated with Rooibos and honeybush extracts, while the other received no treatment. Those who were treated with these herbal extracts showed 70% fewer tumours. The tumours were also smaller and took longer to develop, compared to the untreated group. The antioxidant activity, as well as the anti-inflammatory properties of Rooibos, could be important in this case. The research team at the MRC is now investigating the possibilities of developing a "cosmeceutical" Rooibos product to treat skin cancers.

### Rooibos and liver cancer

In a further study at the MRC rats that drank Rooibos (at a similar concentration that humans drink) had fewer and smaller pre-cancerous lesions in the liver than those who drank water. The inhibitory (slowing down) effects on the development and growth of cancer cells provided further proof that some ingredients in Rooibos could be important as agents to prevent cancer in people.

### Effect of green Rooibos and other teas on oesophageal cancer in rats

This study showed that Rooibos significantly reduced the number and size of the cancerous papillomas in the oesophagus, probably as a result of its polyphenols (antioxidants) content.

### Studies in human cancer cell lines

The study showed that green Rooibos significantly inhibited the growth of the cancer cells, but that traditional Rooibos also achieved this effect at a slightly lower rate. The research was done on cancer cells from human skin, liver, colon and oesophagus. Further research is looking at the mechanism whereby Rooibos inhibits the development of cancer, specifically the balance between cell growth and cell death.

### Unknown cancer-fighting compounds in Rooibos

With this project researchers are trying to explain exactly how the different compounds in Rooibos are able to protect cells against oxidative stress and genetic damage caused by diseases. They have found an apparent unknown compound that seems to provide more or at least similar protection against DNA damage than the known antioxidants. They are busy with further sophisticated chemical and biological analysis of Rooibos' compounds.

### How Rooibos protects against cancer

Studies at the MRC shows that Rooibos reduces cancer-associated changes in animal cells by protecting cells against

DNA damage, or mutagenesis. Cancer develops in several steps and mutagenesis is one of the first steps. During mutagenesis the genetic material (or DNA) of a cell is changed because of excessive exposure to mutagens. Mutagens are physical or chemical agents that can change the DNA in the cell. Mutagens are found in cigarette smoke, sunlight or chemical substances such as hydrogen peroxide. This change in the DNA is known to be a major cause of cancer. Rooibos offers protection (or chemo-prevention) against these mutagens in more than one way:

It is a potent antioxidant, which means that it 'scavenges' free radicals. These are highly reactive molecules that are also produced during normal processes in the human body. Free radicals can damage the DNA of cells, but antioxidants bind to the free radicals and inactivate them before they can cause any damage.

Rooibos also increases the antioxidant status of the liver.

Rooibos stimulates the liver enzymes that break down carcinogens in the body. Ongoing exposure to carcinogens such as certain kinds of toxins and cigarette smoke, will eventually lead to cancer.