

Salvestrols–Natural Products with Tumour Selective Activity

G.A. Potter, Ph.D.,¹ M.D. Burke¹

Medical and scientific evidence shows that a diet rich in fruit and vegetables helps to combat cancer, amongst other diseases. We have evolved a revolutionary concept that explains these observations known as the Salvestrol Concept. Salvestrol is a new word, coined to describe a new concept of how the body defends and heals itself naturally from cancer. Salvestrols are a new class of natural chemicals that are found in plants and can be safely eaten in the diet. They undergo a process of molecular activation specifically inside cancer cells by a special enzyme, CYP1B1, and thereby cause the cancer cells to cease growing or die. It is not that the Salvestrol molecules themselves are new—since their chemical structures and the plants in which they occur have been known for many years—but never before have these chemicals been grouped together on the basis of this particular set of recently discovered anti-cancer pharmacological actions. Moreover, it is now clear that several food plants and plant-rich diets that have traditionally been considered to offer protection against cancer are good sources of Salvestrols. Salvestrols are naturally high in many red or green health-giving plant species, including fruit, berries and herbs—except that modern agriculture seems to have minimized the levels of Salvestrols through a combination of the development of modern plant varieties, the use of antifungal sprays and the selective processing of harvested fruit. Several natural chemicals and synthetic medicinal drugs other than Salvestrols are able to be activated by healthy tissues of the body (although not by CYP1B1), but the key feature of

Salvestrols is that they are activated only inside the cancer cells which they arrest or kill. And although there are hundreds of different enzymes which are ubiquitous in the body, CYP1B1 is confined to cancer cells. The discovery and formulation of the Salvestrol Concept spans about a ten year period around the turn of the current century. In the early 1990s Professor Burke's research group found that a certain enzyme protein, called CYP1B1, was clearly present in the tumour cells of a wide variety of human cancers but was undetectable in the normal cells of the corresponding healthy tissues.¹ The technical description for this is that CYP1B1 is highly overexpressed in cancer cells. This has since been confirmed by a number of eminent laboratories across the world. Then around the year 2000 we discovered that, through a process called metabolism, CYP1B1 brings about a subtle alteration in the chemical structures of certain plant compounds and turns them into slightly different chemicals, called metabolites, that are potent anticancer toxins.² This is the activation process, and the anticancer effects are due, not to the plant chemicals themselves, but to their metabolites generated in the human cancer cells. Professor Potter coined the term "Salvestrol" to describe plant chemicals that are activated in this way.

Thus, there are three components to the Salvestrol concept:

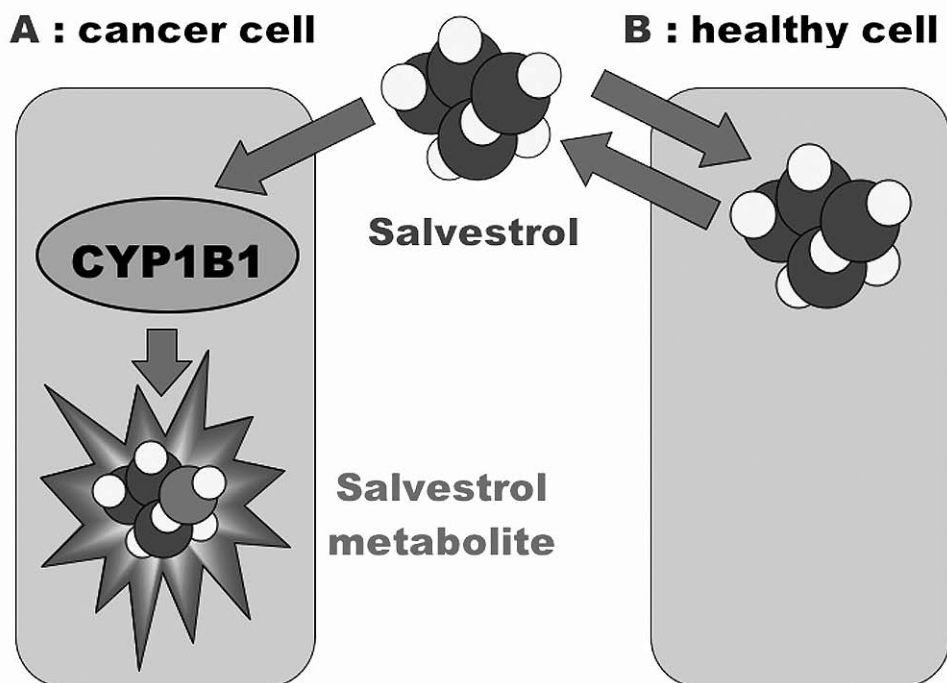
1. Salvestrols - the natural, plant-based chemicals
2. CYP1B1 - the special enzyme found almost uniquely in cancer cells
3. Salvestrol metabolites – the activated anticancer toxins. Salvestrols are taken in the diet. When Salvestrols encounter human cancer cells they are absorbed into

¹ Cancer Drug Discovery Group, Leicester School of Pharmacy, De Montfort University Leicester LEZ 1WR, UK

the cell, where CYP1B1 activates them by converting them into slightly different chemicals, the Salvestrol metabolites, which then act to poison the cancer cell. However, in the case of healthy cells CYP1B1 is tantamount to absent, and so although Salvestrols are absorbed they are not converted into active metabolites and the healthy cells are not poisoned. This concept is shown diagrammatically in the Figure. Currently Salvestrols are identified by testing them against CYP1B1-containing human cancer cells in culture

in the laboratory. The first Salvestrol to be identified was resveratrol, a chemical from grapes that is notably present in red wine and which is widely credited with cancer preventative properties. Resveratrol is metabolized by CYP1B1 into a metabolite, piceatannol, that is a known anticancer toxin.² Other Salvestrols have now been identified in a wide variety of fruits, including tangerines, strawberries and cranberries. In the Salvestrol concept, CYP1B1 acts as a tumour suppressor and rescue mechanism, which enables the body

Figure 1. The Salvestrol Concept (A) in a Cancer Cell: a Salvestrol molecule in the bloodstream diffuses into the cell where it is metabolised by the CYP1B1 enzyme into a Salvestrol metabolite molecule, which poisons the cancer cell. (B) in a Healthy Cell: a Salvestrol molecule diffuses into the cell but, because CYP1B1 is absent, the Salvestrol is not converted into a metabolite and diffuses back into the bloodstream without harming the healthy cell.



to defend and heal itself against cancer by activating some of the natural compounds found in edible fruits and other plants. CYP1B1 is present in the cells of all the different types of cancer that have been investigated to date, including all the most prevalent cancers, for example bladder, brain, breast, colon, esophagus, kidney, liver, lung, lymph node, ovary, skin, stomach, testis and uterus. Think of CYP1B1 as a Trojan Horse inside the cancer cells, which merely has to be provided with Salvestrols in the diet in order to unleash a stream of chemical agents that are deadly to the cancer cells. In other words, in CYP1B1 the body seems to have provided cancer cells with the seeds of their own destruction.

Cancer scientists generally believe that single cancer cells are continually forming in the human body and that most of these are destroyed by the body before they develop into malignant tumours.

Salvestrols in the diet are a mechanism by which this ongoing prevention of cancer can occur. In terms of cancer treatment, most current anticancer chemotherapy is beset by serious side effects. These occur because most anticancer drugs are cell poisons that do not distinguish between cancer cells and many types of healthy cells. Because Salvestrols are activated only within cancer cells, they offer the possibility of anticancer treatment without the awful side effects.

For more information see: www.salvestrolscience.com

References

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2. Potter GA, et al: The cancer preventative agent resveratrol is converted to the anticancer agent piceatannol by the cytochrome P450 enzyme CYP1B1. *Brit J Cancer*, 2002; 86: 774-778.