

Nutrigenomic mechanisms associated with chemoprevention by phytochemicals; a clinical perspective

ISNN ORAL PRESENTATION

May 23rd, 2016

Tel Aviv

Christine Houghton

Epidemiological studies show that diets rich in fruits and vegetables are protective against cancer and chronic disease. However, attempts to translate these epidemiological findings into clinical practice have not yielded the anticipated benefits.

The chemoprotective benefits of plant foods have been broadly attributed to the presence of *antioxidant* vitamins but large-scale clinical trials using supplemental vitamins have been almost universally negative. Nevertheless, antioxidant supplements are popular amongst consumers, including those at risk of or with diagnosed cancer.

The emerging science of Nutrigenomics considers alternative mechanisms by which plant foods may modulate cellular defences. Plant-derived phytochemicals have been shown to influence signalling pathways within human cells. This presentation will highlight the chemoprotective effect of plant-derived bioactives, focusing on the transcription factor Nrf2, capable of influencing the expression of several hundred cytoprotective genes. Nrf2 is influenced by stressors which include phytochemicals, exercise and environmental toxins as activators of endogenous cellular defences.

Recent elucidation of signalling pathways is enabling the development of strategies to activate the cell's multifaceted endogenous defence mechanisms. Knowing how phytochemicals influence cellular defence systems may in time yield to more targeted therapies.

This discussion will examine biochemical pathways capable of activating endogenous cellular defences and in so doing will review several mechanisms by which cancer cells may be directly and indirectly targeted. Furthermore, it will describe some of the phytochemicals with the potential to activate such mechanisms, highlighting those derived from cruciferous vegetables and referring to estrogen metabolism as an example. Several commonly-occurring gene polymorphisms or SNPs are relevant to the discussion as is reference to bioavailability and the dose-response.

In searching for simple solutions to chemoprevention, the science of Nutrigenomics represents a clinical paradigm which would appear safe, effective, quantifiable and able to be readily implemented. Its potential long-term clinical benefit is yet to be fully evaluated.