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## The conundrum of phytochemicals and cancer

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Phytochemicals occupy a unique position in cancer research as they represent the largest class of chemicals that are currently being investigated for the ability to treat cancer (chemotherapy) and the ability to prevent cancer (chemoprevention). Notably this level of investigation into finding new cytotoxics is not without justification as demonstrated by the continued extensive use for cancer treatment of vinca alkaloids (*Catharanthus roseus*), taxanes (*Taxus baccata*), etoposide (*Mandragora officinarum*) and camptothecins (*Camptotheca acuminate*). The relationship between phytochemicals and cancer with regards to chemoprevention is however not as clearly defined as many chemopreventive phytochemicals which can activate important cellular defence pathways are the same chemicals that activate pathways which lead to the development of cancer drug resistance. At the cellular level this seemingly divergent consequence of phytochemical stimulation can be distilled down to the effects of one transcription factor, NF-E2 p45-related factor-2 (Nrf2) which binds to the antioxidant response element (ARE) found in the regulatory regions of over 200 genes involved in both cellular protection and cancer drug resistance [1]. To investigate the potential of phytochemicals to induce this pathway we have utilised a unique cell-based reporter assay [2]. In this presentation our recent efforts to investigate the delicate balance that phytochemicals play in cancer will be considered.

**References**

[1] Hayes JD et al. *Antioxid Redox Signal*. 2010, 13:1713-1748.
[2] Basar N et al. *Phytochem Anal*. 2016; 27:233-238.