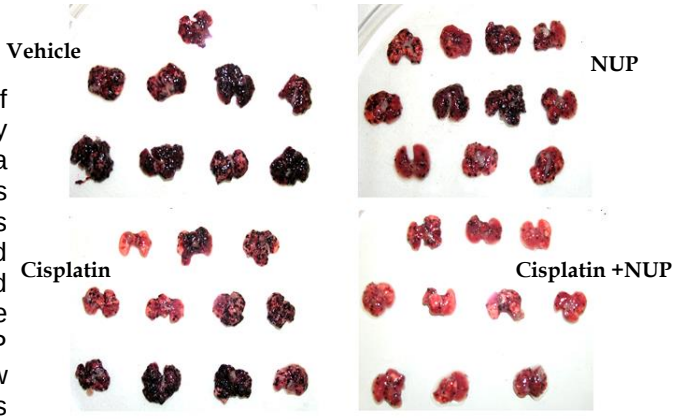
Anti-Inflammatory and Anti-Cancer Effects of *Nuphar lutea* (yellow Water Lilly)

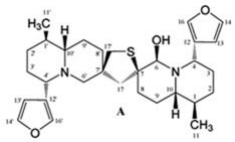
Natural products of *Nuphar lutea* ((Nymphaeaceae) have been widely used for treating inflammatory conditions in ethnic medicine. Scientific investigations on the medicinal properties of Nuphar extracts have indicated several potential applications, such as anti-leishmanial, anti-bacterial and anti-cancer activities. Over the years we have screened a large number of Mediterranean plants used in ethnic pharmacopeia for biological activities including *Nuphar lutea* in order to identify the active compounds of these plants. As a result of our screening, we have identified Nuclear Factor κB (NFκB) inhibitory activity in extracts of various plant parts of *Nuphar lutea*, in which the major components were sesquiterpene thioalkaloids. The NFκB family of transcription factors plays a pivotal role in inflammation and immune responses, proliferation, apoptosis and expression of certain viral genes. Therefore, the NFκB signaling pathway has also provided a focus for pharmacological intervention, primarily in chronic inflammation or in cancer, where the pathway is often constitutively active and plays a role in the disease. The therapeutic and preventive effects of many natural products may, at least in part, be due to their ability to inhibit NFκB. Translocation of NFκB to the nucleus stimulates the transcription of a wide variety of genes. NFκB induces interleukin-1 (IL-1) α and β, Tumor Necrosis Factor α (TNF-α) and other molecules. Given the role of NFκB in cell proliferation and survival, it is not surprising that constitutive NFκB signaling has been implicated in oncogenesis and tumor progression.

The Technology

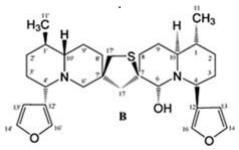
We have shown that that a partially purified mixture of thioalkaloids from of Nuphar lutea (NUP) as well two highly purified NUP fractions inhibited NFκB activation, leading to a powerful effect in inhibiting pro-inflammatory cytokines as well as promoting anti-inflammatory cytokines. These results were observed both in sera from mice injected with LPS and in-vitro, on peritoneal mouse macrophages also activated with LPS. Moreover, mice pretreated with NUP, were protected from lethality induced by LPS. In addition, NUP partially protected mice with peritonitis, providing a window for more efficient treatment with antibiotics during this condition. Animals treated with a combination of the cytotoxic anti-cancer drug cisplatin and NUP acted synergistically and more importantly, NUP showed a very significant reduction of B16 melanoma experimental lung metastasis.



NUP 1



NUP 2



Patent Status

Granted

Research Team

Prof. Avi Golan-Goldhirsch, The Jacob Blaustein Institutes for Desert Research (BIDR), French Associates Institute for Agriculture and Biotechnology of Drylands, Prof. Jacob Gopas and Dr. Janet Ozer, Department of Microbiology, Immunology and Genetics, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer Sheva, Israel

Contact for Licensing and Investment Information

Ora Horovitz Ph.D, Senior VP Business Development, BGN Technologies, E-mail: orabgn@bgu.ac.il