AMERICAN BOTANICAL COUNCIL

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FILE: · **Prairie Medicinal Plants**
· **Ethnobotanical approach to drug discovery**
· **Anti-tumor activity of plants**
· **Anti-HIV activity**

DATE: February 29, 2000 HC 101091

RE: Prairie Plants are Screened for Anti-Cancer and Anti-HIV Potential

Kindscher, K., K.P. Manfredi, M. Britton, M. Demidova, and D.P. Hurlburt. Testing Prairie Plants with Ethnobotanical Importance for Anti-Cancer and Anti-AIDS Compounds. *Journal of Ethnobiology*, Vol. 18, No. 2, pp. 229-245, Winter 1998.

In contrast to the attention drawn to plants from the tropics for their use in pharmaceutical research, few prairie plants of North America have ever been considered. The objectives of the present study were: a) to highlight the potential economic value of prairie plants; b) to screen the plants for potential anti-HIV and anti-cancer activity; and c) to determine whether choosing species for screening based on their Native American ethnobotanical history rather than by random means yields a greater percentage of plants with potential bioactivity.

A total of 203 native prairies species were identified from literature research as having been used for medicine by Native Americans. Of these, 22 were chosen and both aqueous and organic extracts made from them. They were subjected to National Cancer Institute (NCI) biological screens to identify new anti-cancer and anti-HIV chemical leads.

The results of the anti-HIV aqueous assay showed that 12 out of the 20 extracts tested met the criteria for "active": *Achillea millefolium*, *Amorpha canescens*, *Ceanothus herbaceus, Conyza canadensis, Helianthus grosserratus, Ipomoea leptophylla, Liatris punctata, Monarda fistulosa, Oenothera rhombipetala, Pycnanthemum tenuifolium, Rubus flagellarsi,* and *Silphium laciniatum*. This results in 60.0% of the extracts being classified as "active," as compared to the 13.9% rate reported for terrestrial plants by the National Cancer Institute in their large-scale (i.e. random) screening program.

The results of the anti-HIV organic assay showed that only three plant extracts were active: *Ipomoea leptophylla, Glycyrrhiza lepidota,* and *Oenothera rhombipetala*. This results in 13.6% of the extracts being classified as "active," as compared to the 3.0% rate reported for terrestrial plants by the NCI in their

large-scale screening program. Four additional plants showed moderate protection from the HIV in infected cells: *Achillea millefolium, Conyza canadensis, Rhus glabra,* and *Silphium perfoliatum*.

Only one plant extract, *Ceanothus herbaceus*, showed any activity in the anti-cancer aqueous screen, and this activity was slight. Four extracts were found to be active in the anti-cancer organic extract screen (*Helianthus grosserratus, Ipomoea leptophylla, Juniperus virginiana*, and *Solidago canadensis*) and six others showed moderate activity (*Achillea millefolium, Glycyrrhiza lepidota, Liatris punctata, Monarda fistulosa, Silphium laciniatum*, and *S. perfoliatum*). The higher activity of the organic vs. the aqueous extracts may be due to the relative ease with which the non-polar molecules of the organic extracts can pass through the non-polar cell membrane, as compared to the aqueous extracts.

The Native American tribes of the Prairie Bioregion in North America used at least 203 plants to treat 78 different types of diseases. These uses suggest potentially active medicinal constituents. By choosing plants for screening for their history of medicinal uses, the authors were able, they conclude, to increase the proportion of plants active in the NCI anti-HIV screening assay. This shows the promise that these plants potentially have to offer. The authors conclude: "Traditional knowledge of Native Americans should not only be studied (perhaps more appropriately stated as "learned"), but should be honored for the valuable insights it can offer, one of which is leads for finding plants that have active medicinal constituents. In addition, we believe that plants of native prairies and other ecosystems in our own continent merit further exploration and study." —*Ginger Webb*

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