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Nephroprotective drugs from traditionally used Aboriginal medicinal plants

To the Editor: The recent article by Farese *et al.*[1] sheds light on a very important source area of drug development, medicinal plants. People in different cultures, all over the world, have used medicinal plants for a number of diseases. One such traditional medicine system is that of the Canadian Aboriginals. This system has been practiced for centuries and encompasses treating the whole person through mind, body, and spirit. Medicinal plants make up the most important tool in curing a disease. Table 1 lists selected plants used by Aboriginal tribes all over Canada for kidney diseases. Mostly, these are used for diuresis, renal stones and cleansing the kidneys. Plants have also been a major source of new drugs since the inception of modern pharmacology.[2] According to a survey, one-third of all the newly approved compounds are derived from plants.[2] A brief review of the literature shows different plants being effective in preventing/treating renal diseases either in animal models or in clinical trials.[3,4] Some renal conditions reported to respond to plant therapy are glomerulonephritis, IgA nephropathy, membranous nephropathy, glomerulosclerosis, immune complex nephritis, nephrotic syndrome, lupus, tubulointerstitial nephritis, chronic allograft nephropathy, kidney stones, etc.[3,4] Some pharmacological characteristics seen in plants that may contribute in the above-mentioned conditions are antiinflammation; antioxidation; diuresis; immunomodulation; prevention of acute allograft rejection and drug-induced nephrotoxicity; reduction in proteinuria, renal interstitial fibrosis, renal ischemia/reperfusion injury, tubular and mesangial cell proliferation, blood lipid levels, blood pressure, lipid peroxidation, apoptosis, renal necrosis, and calcium oxalate crystal aggregation; and stimulation of renal repair mechanisms, RNA and protein synthesis.[3,4] Continued efforts are required to identify and develop traditionally used medicinal plants in renal diseases so that more effective treatments are available from plants that have been known for their efficacy for hundreds of years.

1. Farese S, Kruse A, Pasch A *et al.* Glycyrrhetinic acid food supplementation lowers serum potassium concentration in chronic hemodialysis patients. *Kidney Int* 2009; **76**: 877–884.
2. Ghayur MN. Role of medicinal plants and their constituents in the understanding and evolution of pharmacology and the autonomic nervous system. In: Govil JN, Singh VK (eds). *Recent Progress in Medicinal*

Table 1 | List of selected Aboriginal medicinal plants traditionally used in kidney diseases

Scientific name	Common name (plant type)	Family	Part used	Traditional use (preparation)	Habitat (tribe)
Acer pensylvanicum	Striped maple (tree)	Aceraceae	Bark	Diuretic (bark tea)	NB, NS, PE, QC, ON (Penobscot, Micmac)
Arctostaphylos uva-ursi	Bearberry (shrub)	Ericaceae	Leaf	Diuretic (tea of leaves)	All of Canada (Algonquin, Blackfoot, Micmac, Salish)
Cornus canadensis	Bunchberry (herb)	Cornaceae	Whole plant	Kidney problems (drinking steeped plant)	All of Canada (Micmac)
Cucurbita sp.	Squash (vine)	Cucurbitaceae	Seed	Diuretic (chewing seeds, seeds pulverized and taken with water)	ON, QC (Chippewa, Plains Indians)
Juniperus cummunis	Juniper (tree)	Cupressaceae	Twig, berry	Kidney problems (twig and berry tea)	All of Canada (Gitxsan, Blackfoot, Micmac, Cree)
Epigaea repens	Trailing arbutus (shrub)	Ericaceaae	Leaf	Kidney stones (infusion of leaves)	Southern Canada (Algonquin, Iroquois)
Larix laricina	Tamarack (tree)	Pinaceae	Gum	Kidney problems (chewing of gum)	BC, ON, QC, Atlantic Canada (Cree, Ojibwe, Chippewa)
Ledum groenlandicum	Labrador tea (Shrub)	Ericaceae	Leaf	Kidney problems (leaves infusion)	All of Canada (Cree, Micmac)
Medeola virginiana	Cucumber root (herb)	Liliaceae	Crushed dried berry and leaf, root	Diuretic (berry and leaf infusion; chewing root)	NS, NB, QC (Iroquois)
Pinus strobus	White pine (tree)	Pinaceae	Bark, needle, twig	Kidney and urinary problems (tea of plant parts)	Atlantic Canada, QC, ON, MB (Algonquin, Iroquois, Ojibwe, Micmac)
Sarracenia purpurea	Purple pitcher plant (herb)	Sarraceniaceae	Root	Kidney problems (drinking steeped root)	Southern Canada (Micmac)

Abbreviations: BC, British Columbia; MB, Manitoba; NB, New Brunswick; NS, Nova Scotia; ON, Ontario; PE, Prince Edward Island; QC, Quebec.

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The Authors Reply: We agree with the commentary of Drs Ghayur and Janssen regarding the importance of medicinal plants in the treatment of many diseases in different cultures and ages.[1] Moreover, today, medicinal plants still represent a vast source of new chemical molecules that continuously promote drug research. However, the uncontrolled resurgence of these 'natural products' observed today, and promoted by thousands of Internet sites, needs several caveats: (1) These remedies are often assumed to be safe (because they are natural). (2) Potential risks associated with such treatments are only poorly studied or reported. (3) These remedies are mostly not under the control of a regulatory system that guarantees a high-quality manufacture of the product.

The adverse effects of such products may involve direct risks such as dose-dependent toxicity, idiosyncratic reactions, teratogenicity, and mutagenicity, and indirect risks when a conventional treatment is abandoned in favor of the natural product. Furthermore, interactions between herbal medicines and conventional drugs may be dangerous and can lead to severe complications such as in the case of St John's wort (*Hypericum perforatum*) when given with other drugs metabolized by P450 CYP3A4 (cyclosporine, coumarines).[2] In renal medicine, among others,[2,3] the most famous medicinal plant-associated problem is Aristolochic-acid nephropathy (*Aristolochia fangchi*), which has led to several cases of end-stage renal failure all over the world.[4]

Therefore, research on medicinal plants as a source of new substances is important; however, in humans, these components should be administered only under well-controlled study conditions. Furthermore, preliminary toxicological experiments in cell cultures or animals would be desirable when such studies are planned.

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