

Meeting Report

Science Across Borders: 5th Annual Natural Health Product Research Conference—March 26–29, 2008, Toronto, Canada

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Canada is experiencing a growing interest in the use of alternative therapies and products particularly natural health products (NHP). In 1997, Canadians spent around C\$ 2 billion on NHP. In an attempt to catch with this popularity of NHP use, Canadian researchers and administrators from academia, industry and government jointly established the Natural Health Product Research Society of Canada (NHPRS). Since its formation, NHPRS has been organizing an annual meeting which brings together world renowned researchers and experts in the area of NHP research. For 2008, the annual NHPRS meeting took place in Toronto from the 26th to 29th of March with a focus on 'Science Across Borders: Global Natural Health Products Research'. The scientific program was spread into three days of plenary lectures and oral presentations. The different sessions containing these talks were on: ethnobotany around the world; chemical analysis of NHP; product standards and quality control; ethnomedicine; novel analytical approaches; systemic research, nutrisciences and molecular medicine; and drug development from NHP. The meeting proved to be a great success in terms of the speakers that were invited and based on the data that was presented which highlighted recent research taking place in the field of NHP not only in Canada but from many parts of the world.

Keywords: meeting – natural health products – alternative therapies – ethnobotany – chemical analysis – quality control – drug development

Introduction

Just like most of the countries in the world, Canada is also seeing a growing interest in the use of alternative therapies and products, particularly natural health products (NHP). The different NHP professionals practicing in Canada are naturopathic doctors, doctors of traditional Chinese medicine, herbalists, homeopaths and ayurveda practitioners (1). In 1997, Canadians spent almost C\$ 2 billion on NHP (2). Seeing this interest in the use of NHP, the Natural Health Product Directorate (NHPD) was established by the federal government to overlook the regulation and rational use of NHP in Canada (3). Later in 2003,

researchers and administrators from academia, industry and government jointly founded a federally incorporated and non-profit organization, the Natural Health Product Research Society of Canada (NHPRS) (4). Since its inception, NHPRS besides working to provide scientific basis for use of NHP in Canada has also been organizing an annual meeting that brings together leading researchers, from all across North America and the world, working in the area of NHP. This year, the NHPRS meeting took place in Toronto from the 26th to 29th of March 2008, with a focus on 'Science Across Borders: Global Natural Health Products Research' (5).

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Ethnobotany Around the World: Opportunities and Challenges

Day 1 began with the opening of the conference by Robin Marles of NHPD, while the welcome and

introduction were delivered by Vladimir Vuksan (President, NHPRS) of University of Toronto, Canada, and John Thor Arnason (Director of NHPRS) of University of Ottawa, Canada. The first plenary lecture was delivered by Tim Johns of McGill University, Canada, who talked about the rising world population, decreasing traditional knowledge and global health problems such as malnutrition and other communicable and non-communicable diseases. He then hypothesized the relevance of ethnobotany to these health problems. Tim described multiple uses of plants and herbs such as: drug discovery like his own work on antiviral and cardioprotective effects of different Kenyan and Tanzanian plants (6–8); providing nutrients in cases of deficiencies such as use of *Grewia tenax* for overcoming β -carotene and vitamin C deficiency (9,10); functional foods like antidiabetic potential of plants (11,12) and use of plants for income generation and poverty reduction (13,14). According to Tim, ethnobotany can really help contain many of the global health and economic problems. To support his claim, he referred to his work in Africa to rebuild the African food systems by focusing on biodiversity (agricultural and forest), dietary diversification and development of natural strategies like encouraging the establishing of home gardens and increasing the use and growth of home-grown vegetables (15–17).

The second plenary lecture was given by Rosario Rojas of Universidad Peruana Cayetano Heredia, Peru. Rosario talked about the work in progress in her lab in Peru on the medicinal chemistry and pharmacology of different indigenous Peruvian plants, mainly for use in infections, inflammation and cosmetology. She gave particular reference to plants like *Myrciaria dubia* that has 30 times higher concentration of vitamin C than orange; *Plukenetia volubilis* for its rejuvenating effects on the skin; *Croton lechleri* for its potential in wound healing, ulcers and cancer; *Lepechinia meyenii* for its spermatogenic and adaptogenic activities and *Uncaria tomentosa* for its anti-inflammatory and antiarthritic use (18–20). This talk was followed by a very energizing lecture by M.J. Nanjen of JSS College of Pharmacy, India, who talked about Ayurvedic medicine, its challenges and opportunities. The speaker started off by stressing the importance of NHP globally and then moved to NHP use in the Indian subcontinent, where he said Ayurveda enjoys immense popularity within the population along with other systems of medicine like Unani, Siddha and Naturopathy. The speaker briefed the audience about the basis of Ayurveda like the concept behind five elements and the importance of synergism within the constituting herbs. He also discussed the recent trend in modern medicine of prescribing multiple therapies for a particular disease—a trend he said is prevalent in Ayurveda and herbal therapy on the whole.

These lectures were followed by a panel discussion on ‘Biodiversity, Ethics and Intellectual Property’ participated by various leaders in the field of NHP. The first speaker of the panel was Mark Blumenthal, Founder and Executive Director of American Botanical Council, USA. Mark talked about the many tribes that are going into extinction around the world and all of their indigenous knowledge that is going away with them. He also talked about biopiracy and patent cases involving maca and turmeric. Mary Hardy of UCLA, USA, talked about ethical considerations in NHP development. She stressed that it is imperative to apply all of the ethical principles like beneficence, justice and autonomy when it comes to developing and propagating NHP use. Simon Brascoupe, a First Nations (Canadian aboriginals) representative, discussed the value of traditional knowledge and how it is transferred from one generation to another. He said that the indigenous knowledge of herbs and their proper use can eradicate many of the health problems seen with the aboriginal people in Canada. Pierre Haddad of University of Montreal, Canada, briefed the audience about the new Canadian Institutes of Health Research’s (CIHR) guidelines for working with First Nation people, which states that researchers should work to: protect the traditional practices and knowledge, state all the intellectual property rights in the research agreement, respect the rights of people involved in the studies and keep the concerned aware of transfer of any sample or data of sensitive nature. Pierre gave reference to his work on the plants from Cree communities in Quebec, Canada (21,22). Finally, Roberta Lee of the Beth-Israel Medical Centre, USA, discussed the power of trust and how this element along with respect can be instrumental when it comes to obtaining knowledge from indigenous people. She referred to her years of ethnomedicine work in Micronesia (23–25), which ultimately resulted in compilation of the Primary Healthcare Manual on Use of Traditional Plants.

Chemical Analysis of NHP

Different speakers on the first day also talked about chemical analysis of NHP. Ikhlas Khan of University of Mississippi, USA, talked about some of the problems with plant identification. He described these as adulteration, contamination or substitution. According to Ikhlas, this can be checked by identifying plants by genetic fingerprinting strategies (26,27). Brian Schaneberg of ChromaDex Inc., USA, presented his findings on an improved technique for analysis of tea constituents by using high-performance liquid chromatography (HPLC). Other speakers also talked about improved or advanced techniques for analysis of plant constituents.

Product Standards and Quality Control

The last session of Day 1 centered on quality control issues of NHP. Loren Israelsen of the United Natural Product Alliance, USA, said that 70% of NHP in United States arrives from China. Most of these products display different Good Manufacturing Practices Certifications that is a cause of concern for the consumers. James Neal-Kababick of Flora Research Labs, USA, discussed how different herb suppliers unfairly add pharmaceuticals into their products to enhance their activity. Later, Steven Dentali of American Herbal Products Association, USA, reiterated the importance of proper identification of herbs and the use of marker compounds in standardization, while Mark Roman of Tampa Bay Analytical Research Inc., USA, discussed the different techniques available to perform such identification procedures. He pointed out the use of the initial organoleptic approach followed by microscopic identification, chemical profiling with thin-layer chromatography and HPLC and lastly genetic profiling.

Ethnomedicine: From Indigenous Practices to Modern Day Use

Day 2 started with a very inspiring talk from none other than Michael Balick of the Institute of Economic Botany, New York Botanical Garden, USA. Michael took off by defining the difference between 'ethnobotany' (relationship of people, plants and culture) and 'ethnomedicine' (relationship of people, environment and healing). He then spoke of the deplorable situation in the world these days for global culture and their practices. He backed his claims with the facts that traditional knowledge of medicinal plants and healing practices are being threatened from generation to generation due to the prevalent processes of desertification and deforestation in the world. Out of the 6800 global languages, only 9% remain to be spoken while indigenous cultures are being destroyed by globalization and that there is heightened hostility against indigenous people all over the world (28,29). He then referred to some of his works with indigenous people and their healing practices in Belize (30–32), Micronesia (33,34) and New York City (35,36). Roberta Lee of Beth-Israel Medical Centre, USA, a long time collaborator of Michael Balick, then spoke about her endeavors with medicinal plants and their constituents.

Novel Analytical Approaches

This session on Day 2 saw very advanced and useful talks summarizing some of the most advanced analytical techniques used and reported in the literature. The session started with a very interesting talk from Peter Hylands

of King's College London, UK. Peter divided his talk in three main portions. Talking first about the controversy of whether or not to standardize NHP for maintaining their quality, he said it is not always possible to standardize, particularly when the active compound in the plant is unknown. He proposed using other alternative techniques such as metabonomics (study of metabolic responses to drugs, environmental changes and diseases) and metabolomics (global analysis of metabolites, small molecules generated in the process of metabolism) apart from the commonly performed chromatographic and spectroscopic techniques. In the second part of his talk, Peter referred to his recent work in which his group has used metabonomics, along with high-resolution ^1H NMR spectroscopy and chemometrics to evaluate the effect of chamomile tea intake on human biological responses (37). This allowed them to see prominent urinary excretion of particular tea constituents in the subjects during the 2 week post-treatment phase. In the last part of the talk, the speaker presented some more intriguing results related to bioinformatics and NHP. The speaker showed how a relationship has been proposed between the different herbal categories of traditional Chinese medicine and the type of phytochemical known to be present in that plant by studying distribution patterns of thousands of compounds from some couple of hundred Chinese herbs. The results clearly suggest significant association between phytochemistry and the traditional language of Chinese medicine (38,39). Later, Susan Murch of University of British Columbia, Canada, reiterated the use of metabolomics and metabonomics in NHP research; James Harnly of Department of Agriculture, USA, touched upon plant sample fingerprinting and profiling and Albert Leung of Phyto-Technologies, USA, discussed the many aspects of quality control approaches for Chinese herbal medicines.

Systemic Research, Nutrisciences and Molecular Medicine

Later in Day 2, different sessions presented specific findings of NHP particularly for cardiovascular health and diabetes. Multiple speakers from all across Canada presented their research data on potential of NHP to: reduce glycation index; modulate the endothelial function; produce antihyperlipidemia; produce antihyperglycemia; inhibit formation of advanced glycation end-products; regulate insulin sensitivity and produce memory enhancing effects.

Drug Development from NHP

The last day of the conference was blessed with the presence of undoubtedly one of the most notable and popular figure in NHP research, Norman Farnsworth of

University of Illinois, USA. Norman presented the participants with a history of drug development as influenced by natural products. Beginning right from the 17th century, he travelled all through the time giving reference to some of the most notable discoveries from natural sources like that of reserpine and how this compound changed the overall scenario of pharmaceutical companies in the mid-20th century. After the discovery of reserpine, most of the pharmaceutical companies in those days initiated a NHP research unit in their companies to hunt for more plant-derived active compounds (40,41). He then touched upon the many anticancer and anti-diabetic compounds discovered in the late 1950s (42,43). Then in the late 20th century, the interest in natural product research faded away for the pharmaceuticals. But then, in that era, the National Center for Complementary and Alternative Medicine, USA, and NHPD, Canada, were formed. According to Norman, the future for NHP is not very bright. This is because of the overall economic slump United States is going through, which will indirectly reduce the amount of funds available for NHP research.

Pierre Haddad of University of Montreal, Canada, was the last notable speaker of the meeting. Being a recent recipient of a CIHR team grant to study Canadian aboriginal Boreal plants for their potential against diabetes, he enthralled the participants about his team project, its constitution and the results obtained so far. Pierre showed how engaging pharmacologists, clinician scientists, nutritionists, ethnobotanists, phytochemists and toxicologists can work to give scientific results on the effectiveness of plants used since centuries by indigenous people for diabetes care here in Canada (21,22).

Conclusions

This meeting of the NHPRS of Canada was a successful event not only because it brought together most of the members of this community of NHP researchers in Canada but also helped present the views of people on NHP from many other parts of the world including North and South America, Europe, Africa and Asia. Like in the past years, this meeting showed the kind of basic and clinical NHP research taking place in Canada and hopefully will continue to do so in the coming years as well.

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