

Laurentian University Department of Chemistry and Biochemistry Conducting Hair Study in Greater Sudbury

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Sudbury, ON - *Life is an endless struggle full of frustrations and challenges, but eventually you find a hair stylist you like.* Hair over the years has found increasing validity in areas outside of styling. In the summer of 2004, with support from the Natural Sciences and Engineering Research Council of Canada (NSERC), Laurentian University's Department of Chemistry and Biochemistry embarked on a preliminary study utilizing hair samples from residents in the City of Greater Sudbury. The project, entitled *Content of Elements of Environmental and Nutritional Importance in Hair Samples of Selected Sudbury-area Residents*, is being investigated by Firhan Malik, a Laurentian University 4th year biochemistry student.

As project supervisor and Director of MIRARCO's Centre for Environmental Monitoring (CEM), Dr. Graeme Spiers states, "There is an opportunity to learn and do some excellent analytical chemistry here, which will provide very valuable data". The research team discussed this study with regional health professionals to ensure that a relevant epidemiological study is performed, and to aid in data interpretation as the study progresses.

For this project Mr. Malik is collecting hair samples from Greater Sudbury residents and analyzing them using some of the most modern instrumentation on the market, including the latest in inductively coupled plasma - mass spectrometry (ICP-MS) systems, recently installed by CEM in the Willet Green Miller Centre on the Laurentian University campus. This sophisticated instrumentation is ideal for quantifying metal content of a variety of media.

Knowledge of the trace metal content of hair can help predict the nutritional and health status of an individual, as hair is an excellent biomarker. The trace metal content in hair can also be used to determine environmental exposure. Hair is essentially the archivist of trace nutrient balance of the human body and serves for a longer timeframe than either blood or urine.

The Sudbury Basin is a "natural petrologic laboratory" containing one of the world's richest concentrations of copper, platinum, nickel, and gold. The relationship between such metals in soil, food, water and human biological samples have not been examined in any great detail to date. A preliminary study was undertaken in the 1970s by Dr. D. E. Goldsack and his research team at Laurentian University, however the study was never published. Mr. Malik and CEM hope to pick up where Dr. Goldsack's team left off and come up with some very valuable information on the health of the Greater Sudbury community.

To date, over 300 Sudbury residents of all ages from many occupational sectors and residential areas have willingly participated in this project. Several local hair salons are also actively involved in assisting with the sample collection, including La Moda Hair Care Centre, Faiella Classic Hair, Joe's Barbershop, and Carmen's Barbershop.

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Reference:

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Background:

Over the years hair has found increasing validity in areas outside of styling or forensic science. In analyses of exhumations from the Franklin expedition in Northern Canada, for example, hair analyses were crucial in developing a plausible relationship between possible disorientation and nutrition, as the explorers' diet was being contaminated with relatively high levels of lead from the tin cans used to preserve food. The metal content in hair can help to flag health problems. For example, the hair of epilepsy patients has been found to contain very little zinc relative to non-epileptic patients. Also, the copper to chromium ratio in hair is altered in patients with coronary artery disease. Chromium is also a potential marker for susceptibility to glucose intolerance, a precursor to diabetes.

For this research project small hair samples are carefully trimmed from the nape of the neck and dissolved with pure acids. Participants of the study are then asked to complete a short questionnaire providing crucial lifestyle and dietary information for the research team such as area of residence, age, sex, diet, and health status. All information in this study remains confidential and at their request, each participant can get a complete overview of their own results, including what the results could mean, and a synopsis of the entire study.