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IWU Chemist Wins $25,000 Grant To Study Cancer-Causing Agents

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BLOOMINGTON, Ill.--Cancer-causing agents found in the environment that trigger lung and colon cancer are the target of research that will be conducted by an Illinois Wesleyan University chemist and four sophomore students under a two-year, $25,000 grant from the Petroleum Research Fund, administered by the Washington, D.C.-based American Chemical Society (ACS).

Ram Mohan, assistant professor of chemistry, was awarded the grant on Dec. 10. He will lead the research project probing reaction mechanisms of epoxides, an important class of organic compounds. Epoxy glue, for example, is made from epoxides.

Epoxides Target of Study

"Epoxides," Mohan explained, "play an important role in environmental carcinogensis. Our research is aimed at understanding a class of compounds--polycyclic aromatic hydrocarbons (PAH)--which are widespread environmental carcinogens."

These cancer-causing agents, for example, are associated with automobile exhausts and leaf burning. "Every time you fill up your car with gas," Mohan explained, "you are exposed to them in small amounts."

These agents are primarily associated with lung cancer and to some degree colon cancer. They became cancerous as a byproduct of metabolism, a process by which the body attempts to detoxify the cancerous substance.

"What we're going to do," Mohan said, "is study the reaction mechanisms of various epoxides to understand how they react and how that leads to cancer in nature. They react with DNA in nature, causing cancer."

DNA is the main component of chromosomes and is the material that transfers genetic characteristics in all forms of life.

Possible Research Application

Development of cancer-fighting drugs could be a possible offshoot of Mohan's research.

"To design drugs," Mohan explained, "we have to understand the cause of the cancer from the chemical standpoint. For example, how fast the epoxides react."

Mohan has had a longstanding interest in studying cancer from the organic chemistry perspective, stretching back to his graduate school and post-doctoral training experiences. Organic chemistry is the study of compounds containing carbon.

Student-Oriented Research Project

The project, according to Mohan, will be very student oriented. Four IWU sophomores will do the work. Two of the students have been selected: Steve Tymonko, a chemistry major from

Champaign, Ill., and Jesse Blazek, a chemistry major from Springfield, Ill.

"Some think only graduate students can do cutting-edge research," Mohan said. "But we believe cutting-edge research can be done with undergraduates also."

These students will have the opportunity to co-author peer-reviewed articles for scientific journals and they will make presentations at ACS national meetings as the research project unfolds.

"These experiences," Mohan explained, "give students the opportunity to see what the real research world is like. They go to national meetings and are exposed to an enormous amount of cutting-edge research.

"Last August," Mohan continued, "I took three students to a national meeting of the American Chemical Society in Boston. They came back excited and enthusiastic. They had the opportunity to interact with top scientists and learn a lot about their work."

These types of experiences, Mohan said, help prepare students for graduate school or careers in industry.

Teaching and Research Links

Mohan also sees important linkages between teaching and research-- both of which will be pivotal parts of this research project. "Teaching and research," he points out, "go hand-in-hand. They absolutely enhance each other. Teaching and research are not two watertight compartments."

Mohan believes "research is necessary to motivate students to think critically in their fields. Presentation of research findings allows students to improve their communications skills. It is in the laboratory that students truly understand and learn the practice of science by pursuing the scientific method of solving nature's puzzles."

Research, according to Mohan, also helps faculty keep current on new developments in their fields--an important factor in good teaching.

"It's exciting to get to know that your research is validated by experts in the field and others outside of campus," Mohan said, referring to the competitive grant-awarding process and the fact that this is his first ACS research support.

"ACS sent the proposal," Mohan added, "to experts in the field to determine the scientific feasibility of the project and whether it was realistic to think the project could be done at an undergraduate school."

Mohan's Background

Mohan, 33, was born in New Delhi, India. He received a bachelor of science degree (with honors) in chemistry from Hansraj College in Delhi, India, in 1985; a master of science degree in organic chemistry from the University of Delhi, India, in 1987; and a doctorate in chemistry from the University of Maryland, Baltimore, in 1992.

Mohan was a post-doctoral research associate at the University of Illinois, Urbana-Champaign in 1992-94, and a visiting assistant professor of chemistry at Coker College, Hartsville, S.C., in 1994-96.

Mohan joined the IWU faculty in 1996.

He is a member of the American Chemical Society and the American Society of Pharmacognosy.

Mohan is the co-author of eight research publications--several of which were co-authored by

IWU students--and has made scientific presentations at meetings of professional organizations such as the American Chemical Society.

About the Petroleum Research Fund

The Petroleum Research Fund was established in 1944 by several major oil companies--including Shell and Standard Oil of California--and others as a charitable, scientific, and educational organization with financial relationship with the American Chemical Society.

About IWU

IWU, founded in 1850, enrolls about 2,000 students in a College of Liberal Arts, and individual schools of Music, Theatre Arts, Art, and Nursing. Since 1994, these facilities have been added to the IWU campus: a $15 million athletics and recreation center, a $25 million science center, a $6.8 million residence hall, and a $5.1 million Center for Liberal Arts.

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