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University Relations

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**Toxicology graduate student Jenna Benson '07 studies the effects of Echinacea**

*Summary: Two articles from her work on the herbal supplement have been submitted for publication in Food and Chemical Toxicology and Toxicology and Applied Pharmacology.*

(September 8, 2009)-Jenna Benson '07, a third-year toxicology graduate student in the Department of Biomedical and Pharmaceutical Science at the University of Montana, returned to campus to share stories and information about research conducted as an undergraduate student and a graduate student with current Morris chemistry, biochemistry, and biology students.

Jennifer Goodnough, associate professor of chemistry, describes Benson as “a poster child for interdisciplinary studies.” Benson began her Morris career as a pre-med student, but she “got hooked by the research bug.” During her campus visit, Benson spoke to students about the impact of her Morris undergraduate research experience, funded by a National Science Foundation—Research Sites for Educators in Chemistry grant, with Nancy Carpenter, professor of chemistry, and Kris McNeill, associate professor of chemistry on the Twin Cities campus. As a Morris student, Benson also conducted research through a summer National Science Foundation—Research Experience for Undergraduates (NSF-REU) opportunity at Texas A & M.

Echinacea research

Seeking a better understanding of its effects, Benson researches the popular herbal supplement Echinacea used to alleviate respiratory infections. Because herbal supplements are exempt from pre-market safety and efficacy testing mandatory in the pharmaceutical industry, the molecular mechanisms of Echinacea's claimed effects are poorly understood.

Benson obtained two Echinacea extracts and examined immunomodulatory effects on dendritic cells, an important cell population that bridges the innate and adaptive branches of the immune system. She analyzed the effects of the extracts on key stages of maturation in these cells and found that the Echinacea extracts were immunostimulatory or immunosuppressive depending on the part of the plant from which the extract was obtained and the extraction method.

Benson's NSF-REU research was published in *Bioorganic and Medicinal Chemistry*: “Synthesis and cellular effects of cycloterpenals: cyclohexadienal-based activators of neurite outgrowth,” Bench, B.J., Tichy, S.E., Perez, L.M., Benson, J., Watanabe, C.M. Two articles from her graduate work have been submitted for publication in *Food and Chemical Toxicology and Toxicology and Applied Pharmacology*.

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