



# Dr. Jeffery Hall

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**Location: Merrill-Cazier Library room 154**  
**January 29, 2009 from 3:30 – 4:30 PM**

## ***“Acute Selenium Toxicosis, The Chemical Form Causes Major Differences”***

Natural selenium (Se) toxicosis is endemic and occurs in natural seleniferous areas and areas with selenium contamination. This occurs primarily due to the ingestion of certain plants that can concentrate Se obtained from the soil. Cases of natural Se poisoning in animals have been reported from several regions in the United States, and around the world. During the past 15 years, several cases of acute Se poisoning in sheep and horses have been documented in Soda Springs, Idaho. Selenium exposure was by consumption of plants from a phosphate mining reclamation area.

Organic Se has been reported to be major component of many Se-accumulating plants. Much less is known about the toxic effects and kinetics of organic forms, as compared to the inorganic forms of Se. In our studies, acute toxic effects and systemic kinetics of selenite, selenate, selenomethionine, and Se from the accumulator plant Woody Aster have been evaluated in terms of toxicity, clinical syndrome, pathology, and kinetics.

The study demonstrated that selenomethionine was about twice as bioavailable, but less toxic than Se in other chemical forms. Selenium from selenomethionine had the highest absorption rate, tissue concentrations, and tissue residues. The systemic kinetics, as well as the respiratory elimination differed significantly among the selenium types. But, no correlation between time to peak selenium concentration in whole blood or serum, and peak concentration in the exhaled air was identified.

Subsequent evaluation of the Woody Aster, by High Performance Liquid Chromatography attached to an Inductively Coupled Plasma-Mass Spectrometer, found that the predominant form of Se in the plant was selenate. This data indicates that more information on chemical form of Se in various plant types is needed. Thus, future studies will be evaluating a variety of plants across the growing season to identify differences among the plants and seasonal changes.

Results of these studies also emphasize the necessity of understanding what chemical forms of minerals are used in supplementation programs or evaluation of animal tissue concentrations from potential toxic events.

**Refreshments will follow in the Biotechnology Building Lobby**

Seminar