

Civil & Environmental Engineering

Washington State University



ENVIRONMENTAL ENGINEERING FACULTY CANDIDATE SEMINAR



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Dr. Edward P. Kolodziej is currently an Associate Professor in the Department of Civil and Environmental Engineering at The University of Nevada, Reno. His research interests include contaminant fate and transport, trace organic contaminants, endocrine disruption, non-point source pollution control, and characterization of natural and engineered systems. Dr. Kolodziej received his M.S. and Ph.D. in Environmental Engineering from the University of California, Berkeley, and a B.S. in Chemical Engineering from the Johns Hopkins University

Conserved Structure, Conserved Risk: Implications for Environmental Transformations of Steroidal Pharmaceuticals

In general, the existing regulatory and risk assessment paradigm for environmental contaminants is relatively simplistic, often equating contaminant attenuation with significant reduction in associated ecological risk. However, there exist a number of contaminants whose environmental fate characteristics confound this assessment paradigm and whose risk cannot be accurately assessed solely by laboratory studies demonstrating attenuation of concentrations in model environmental systems. For example, the vast majority of U.S. beef cattle receive synthetic growth-promoting implants using the androgen trenbolone acetate (TBA), although TBA metabolites are potent endocrine-disrupting compounds in aquatic organisms. TBA metabolites are often considered rather reactive and prone to degradation, thus limiting their persistence, and risk assessment studies specifically point to their rapid degradation as evidence for limited ecological risks. However, we have recently demonstrated a most unexpected observation for TBA metabolite fate in environmental systems: namely that product-to-parent reversion is possible for TBA metabolites and related compounds. Also, a variety of structural analogs and stereoisomers can arise from transformation processes, likely yielding a range of uncharacterized steroid structures capable of receptor interactions in the aquatic environment. These observations confound most all current environmental risk assessment and contaminant fate models, therefore environmental risk assessment approaches need to specifically account for transformation products and non-target receptor interactions. Here, we will focus on the environmental fate and transport of TBA metabolites in agro-ecosystems, extend these findings to other environmental contaminants, and discuss their implications for environmental risk assessment and green chemistry.

Date: Friday, March. 7, 2014

Place: Sloan 169

Time: 11:00 a.m. — 12:00 p.m.