

Effects of Heavy Metals on Vitamin D and Estrogen Receptor Signaling in Cultured Human Cell Lines

Dr. Peter Jurutka

The Molecular Endocrinology Laboratory at ASU West, led by professor Peter Jurutka, applies modern molecular medicine approaches to elucidate fundamental questions in human health and disease. Researchers in the Jurutka laboratory study the mechanism of action of steroid hormones and their receptors, with particular emphasis on vitamin D and its role in the pathophysiology of diseases. Specifically, for the New College Environmental Health Science Scholars program, students in the Jurutka lab will employ human cell culture models, particularly gastrointestinal and kidney cells, to study environmental heavy metals such as cadmium, lead, etc. and their potential for interaction with vitamin D and estrogen receptor signaling. Areas of mechanistic inquiry include: 1) the ability of heavy metals to drive dysregulation of the vitamin D axis, including the potential to adversely control expression of CYP24A1 and CYP27B1 enzymes involved in the metabolism of vitamin D, 2) the role of heavy metals in bone disease, and 3) the possible relationship between serum vitamin D status and heavy metal tissue accumulation. Moreover, given the role of cadmium as a potential endocrine disruptor and estrogen mimetic, students will explore the possible impact of cadmium on both ER α and ER β signaling. Finally, projects will include illumination of crosstalk between estrogen and vitamin D in terms of heavy metal-mediated development of disorders in bone and mineral metabolism, and how the vitamin D and estrogen endocrine systems interact to influence metal toxicology.