Exposure to inorganic arsenic (iAs) is a concerning public health issue. Given its natural occurrence in soil and rock, globally, at least 140 million individuals continue to be exposed at harmful levels through contaminated groundwater. Exposure to iAs is of particular concern for pregnant populations due to its links to lower birth weight (BW). Key to developing public health interventions aimed at reducing prenatal iAs toxicity is knowledge of its metabolism. Upon ingestion, iAs is sequentially methylated in a process that is dependent on the one-carbon metabolism (OCM) pathway. In this nutritionally-regulated pathway, the methyl group of folate is transferred to homocysteine using a reaction that utilizes vitamin B12 as a cofactor to promote generation of S-adenosylmethionine (SAM), the primary methyl donor for a variety of methylation reactions—including methylation of iAs. Since OCM micronutrients (e.g., folate) play such critical roles in the pathway, individual susceptibility to iAs toxicity is influenced by serum concentrations of folate and other OCM micronutrients. There is also robust evidence suggesting that folate nutritional status influences the risk of iAs-associated health outcomes such as skin lesions, but impacts during pregnancy, where OCM is altered to support the demands of the developing fetus, have been investigated less. This week’s seminar describes a study in which we evaluated maternal diet as a potential intervention for iAs-associated lower BW in 200 mother-infant pairs residing in Mexico between 2011 and 2012. More specifically, we evaluated effect modification of associations between multiple biomarkers of prenatal iAs metabolism and BW by maternal serum folate, vitamin B12, and homocysteine in the Biomarkers of Exposure to ARsenic (BEAR) pregnancy cohort.

Through attending this seminar, I hope you will learn more about:
1. The widespread issue of, and harms associated with, iAs exposure.
2. The influence of one-carbon metabolism on iAs toxicity.
3. Potential mechanisms underlying findings from our study.