Abstract

There are more than 100 million individuals exposed to inorganic arsenic at levels that exceed the 10 μg/L World Health Organization and U.S. Environmental Protection Agency limit through contaminated drinking water. These people experience a chronic, lifetime exposure that has been associated with increased incidence of numerous cancers and non-cancerous diseases. Among the non-cancerous disease associated with chronic arsenic exposure, adult onset diabetes is of specific interest because of its high global prevalence. Approximately 700 million adults worldwide have been diagnosed with adult onset diabetes. Arsenic-associated diabetes is interesting as it occurs later in life, suggesting it would have a similar etiology to Type 2 diabetes, which is caused by resistance to insulin, a signaling hormone. However, current molecular research suggests that individuals suffering chronic exposure to elevated arsenic levels primarily develop diabetes from beta-cell dysfunction (as seen in Type 1 Diabetes) in conjunction with insulin resistance (as seen in Type 2 Diabetes). This suggests that arsenic-induced diabetes represents a unique disease. This seminar shows how data obtained from a human population can be used to determine if arsenic-associated diabetes is indeed different from typical Type 2 Diabetes, and to identify potential novel biomarkers for arsenic-associated diabetes.