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## Preparation of human placenta for trace element analysis

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The goal of this project is to complete the chemical analysis of 167 archived human placentas that were collected between 1992 and 1999. The analysis of these tissues for the presence of environmental pollutants offers the possibility of exposure measurements in both the mother and fetus. However, placental tissue has rarely been utilized as a biomonitoring tool, and few credible results currently exist for the determination of trace elements in the human placenta.

In this study, we plan to use inductively coupled plasma mass spectrometry (ICP-MS) to measure select essential and non-essential trace elements, and the rare earth elements of the lanthanide series in the tissues. In the future, we hope to relate these analytical measurements to a dataset of demographic variables of the study participants.

Successful chemical analysis of placental tissue is only possible following careful attention to sample handling and preparation. Here we describe some of the key preanalytical variables associated with collecting and analyzing the human placenta. The tissues have been separated into three components (placenta body, myometrium, and umbilical cord) to enable comparisons between trace element concentrations in each portion of the placenta. Sample homogeneity and contamination concerns are discussed, along with long-term storage of the archived materials.

Analytical methodologies developed for the determination of trace elements in the human placenta are also described. The use of a microwave-assisted digestion procedure was compared with overnight digestion in tetramethylammonium hydroxide (TMAH) at room temperature. Method validation was accomplished through the analysis of certified reference materials (CRMs).