Human exposure to heavy metals is ubiquitous and can be in form of food, water and air. Studies have shown that heavy metals are present in biological fluids and various tissues at elevated levels after exposure. However, little is known of how heavy metals influence visual function such as contrast sensitivity and dark adaptation as well as pathophysiologic events associated with ophthalmic diseases such as cataract and retinal degeneration. Further, meaningful data describing in-vivo heavy metal deposition in eye tissues and fluids is lacking. In an effort to shed light into this topic, lens and aqueous tissue samples were collected and analyzed from patients undergoing cataract surgery. Analysis was carried out by total reflection X-ray fluorescence, which permits for quantification of extremely small sample amounts as present in the case of ocular fluids. Preliminary data indicate a potential link between some heavy metals and increased body weight. Additional samples are being obtained from patients suffering from obesity to underscore these findings. Unfortunately cataract surgery is an invasive procedure and requires surgical replacement of the human lens to obtain specimens for analysis. An alternative method of detection of heavy metals in eye fluid is analysis of the lacrimal tear fluid, a highly accessible secretion that may provide important data regarding heavy metal accumulation in acinar ductal secretary glands. One possible way to assess lacrimal tear fluid for heavy metal content is by using contact lenses. Contact lenses are commonly worn for vision correction and can be soft or hard. Modern soft contact lenses consist of a silicone backbone structure to retain electrolytes for a more comfortable wear over a longer period of time. To inquire the feasibility of using soft contact lenses as a medium of collecting lacrimal fluid and analyze heavy metals in the fluid, different types of soft contact lens types were tested for its ability to retain heavy metals. It was found that one specific contact lens type appears to have good metal retention ability. Further investigations as to how the lenses behave during actual wear are currently in progress.