IS – 05
The Scientific basis for Chelation in Lead Poisoning

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This presentation will focus on rodent, primate and human studies that have been conducted to help inform the scientific basis for the use of chelation treatment. Chelation has long been used, but has raised questions as to its real benefit.

Chelation is a chemical reaction in which metal is bounded to chelator by coordination bond. Organic ligand that bind metals are called chelators. The chelate product is a metal complex. Five and six membered chelate rings are the most stable, and polydentate chelators are more stable chelates than chelators with only one ligand atom. Denticity refers to the number of donor groups a single ligand that bind to a central atom. Ligands with one bonded atom are called monodentate, and if more than one bonded atom is present, they are referred to as polydentate or multidentate. The stability of chelates depends on the metal and the ligand atoms. For example, lead and mercury have greater affinities for sulfur and nitrogen than for oxygen ligands than calcium, which favors oxygen. These differences in affinity serve as a basis for discernment of action of a chelation agent in the body.

For example, succimer treatment hastens the elimination of lead from the body, but chelation is only slightly better than the interruption of lead exposure alone. Studies in primates treated with a course of succimer indicated that chelation did not significantly reduce brain lead levels compared to controls. Rodent studies of one or two 3-week courses of succimer reduced brain lead levels, and that two courses of succimer were significantly greater than one. Reductions in blood lead levels are relatively poor predictor of reductions in brain lead levels. Studies in rodents demonstrated that succimer alleviates certain types of lead-induced cognitive metrics, but this was not seen in humans. In rodents, succimer produce adverse neurobehavioral effects when administered to non-lead-exposed rodents.

Learning Objectives
The attendee will understand the mechanism of chelation.
The attendee will understand the is the extent of brain lead reduction with chelation, and the relationship of blood lead to brain lead?
The attendee will learn about the effects of chelation and neurobehavioral changes in lead poisoning?