Tungsten may not be the best shot for making 'green' bullets

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With efforts underway to ban lead-based ammunition as a potential health and environmental hazard, scientists are reporting new evidence that a prime alternative material for bullets — tungsten — may not be a good substitute The report, which found that tungsten accumulates in major structures of the immune system in animals, appears in ACS' journal *Chemical Research in Toxicology*.

Jose Centeno and colleagues explain that tungsten alloys have been introduced as a replacement for lead in bullets and other munitions. It resulted from concern that lead from spent ammunition could harm wildlife when it dissolves into water in the soil, streams, and lakes. Scientists thought that tungsten was relatively non-toxic, and a "green" replacement for lead. Recent studies suggested otherwise, and with small amounts of tungsten also used in some artificial hips and knees, Centeno's group decided to gather further information on tungsten.

They added small amounts of a tungsten compound to the drinking water of laboratory mice, used as surrogates for people in such research, and examined the organs and tissues to see exactly where tungsten ended up. The highest concentrations of tungsten were in the spleen, one of the main components of the immune system, and the bones, the center or "marrow" of which is the initial source of all the cells of the immune system. Further research, they say, will be needed to determine what effects, if any, tungsten may have on functioning of the immune system.