PROBIOTICS and LEAD REMEDIATION

1. Significant removal was observed, and it was found to be metal and bacterial strain specific. Removal was a fast, metabolism-independent surface process. It was also strongly influenced by pH, indicating that ion exchange mechanisms could be involved. The most effective metal removers were Bifidobacterium longum 46, Lactobacillus fermentum ME3 and Bifidobacterium lactis Bb12. The highest maximum cadmium and lead removal capacities of 54.7 mg metal/g and 175.7 mg/g dry biomass, respectively, were obtained with B. longum 46.( <http://www.sciencedirect.com/science/article/pii/S0168160506005952>)
2. I suggest a careful study of this research. There are many parallels to yours.
3. I suggest avoiding the use of streptococcus species for bio-safety puposes.
4. Developing the selective stain by evolution is an excellent an excellent idea. Please give consideration to bio-toxicity, bio-acclamation, and toxicity to exoenzymes. Follow the work of the researches in item #1 since genome manipulation is a lengthy process. Probiotics developed by evolution can be freeze dried and stored for future use.
5. Harvest probiotics in the middle phase of “S” growth—first derivative change equal zero.
6. If successful in producing an evolutionary species and mass culturing with appropriate media, you will then engage in animal experimentation with the chromo-proteins for quantification.
7. Any further development (clinical trials) will necessitate FDA involvement.
8. Be aware that only 20 % of lead in absorbed via drinking water.
9. Consideration must be given to the pH of the gut and how this might change with diet.
10. Consideration must be given to competing metals that can reverse metal enzymatic binding by virtue of being stronger oxidizing agents. Say a person taking iron tablets, which is common, could reverse lead binding.
11. The current practice of the MassDEP Drinking and Program in collaboration with EPA is to abate lead, but the long term goal is its ultimate removal everywhere in drinking water facilities and all appurtenants.
12. The work developed here has more relevance in situation where the consumer may be uncertain of the lead content of water; places where are no environmental regulations and caution need to exercised; hence, a prophylactic or emergency resort.

**Conclusion**: Rather than using humans or animal species as portals for lead elimination, the current goal of the Department is to eliminate lead before consumption, but we recognize the potential for emergency intervention is this promising research.