

*Session SSL-13A: Steller Sea Lion: Factors Currently Affecting the Population  
Diseases, Parasites and Contaminants*

**An Investigation of the Potential Effects of Environmental Contaminants on  
Immune Function and Health in Free-Ranging Steller Sea Lions**

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The western stock of the Steller sea lion (*Eumetopias jubatus*) has undergone a severe population decline, but the cause(s) of this decline is not known. Environmental contaminant exposure is one of the identified putative factors. In field studies conducted during live-capture operations from 1995 to 2001, we investigated organochlorine (OC) contaminant and mercury exposure, the general health of Steller sea lions, and the development of immune function in juvenile sea lions. We optimized and validated multiple immune functional assays, which were then used to define each of the components of the immune system in relation to age. Our approach included lymphoproliferative assays, immunoglobulins levels and less specific white blood cell differential counts to demonstrate perturbations in leukocyte subpopulations and inflammatory/stress responses. By examining multiple cohorts of sea lions from different stocks, we documented the baseline for variation by individual sea lion, stock, age, and stress level in immune function. These baseline data are needed to use these assays to assess the health of free-ranging otariids. We established reference ranges for normal leukocytes subpopulations for different age groups of free-ranging juveniles. Additionally, we conducted expanded health surveys including serology, parasitology, bacterial cultures, virology, fungal cultures, testing for *Chlamydia* as well as detailed physical examinations. These investigations detected significant correlations between OC exposure and impaired immune function at several levels. Responses to mitogen stimulation using lymphoproliferative assays were negatively correlated to PCB levels. Total mercury concentrations in fur were significantly higher in sea lions from Prince William Sound than Southeast Alaska. Although the total mercury concentrations were within the toxic range of terrestrial mammals, no impact of mercury exposure on health could be demonstrated.

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## Abstracts



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