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## Syndicated Features

### Are Marine Mammals the New Canaries? Pollution Targets the Immune System

By Michael Castleman

In the Baltic sea during early 1988, more than half of the harbor seals - some 25,000 animals - suddenly died. The die-off, the largest ever recorded for seals, was caused by a virus very similar to the one that causes distemper in dogs. Environmentalists immediately pointed to what they believed to be cause - industrial wastes discharged into the Baltic. But scientists were not sure. Pollution was certainly a possibility, they said, but sometimes new viruses emerge by chance and wreak havoc. Bestsellers - *The Hot Zone* and *The Coming Plague*, and the Dustin Hoffman film, *Outbreak* - have warned of our vulnerability to new, developing viruses. Perhaps the Baltic seal die-off was simply an example of a sudden spurt of viral evolution.

But the Baltic seal die-off has not been not the only fatal epidemic in marine mammals. In 1987 in Siberia's Lake Baikal large numbers of seals died from a similar distemper-like disease. In 1988, white-sided dolphin carcasses washed up along the coast of Maine, killed by the same virus. And since 1990, more than 1,000 Mediterranean striped dolphins have died of a similar ailment.



Other fatal illness also appear to be on the rise among marine mammals. During the late 1980s, 750 bottlenosed dolphins died of pneumonia along beaches from Florida to New Jersey, their skin disfigured as though burned with acid. In 1989, a mysterious fungus was discovered in 274 dolphins that washed up dead on along the coast of the Gulf of Mexico. And in 1991, analysis of 39 harbor seals that died in New York harbor showed unusually low numbers of white cells in their blood. White cells play a key role in the immune system's ability to fight infection.

According to a Science News report by Janet Raloff (see Resources), in the aftermath of these incidents, tissue tests showed that the fat of the dead marine mammals often contained unusually high levels of polychlorinated biphenyls (PCBs), a widely distributed, toxic industrial pollutant and a member (along with dioxin) of a class of chemicals called organochlorines. In the past, organochlorines have been linked to

increased cancer risk, and to the feminization of male wildlife (because they have effects similar to the female sex hormone, estrogen). But until the marine mammal epidemics, these toxic pollutants had never been persuasively associated with immune deficiencies that made animals vulnerable to infectious diseases.

To medical researchers, the association between marine mammal fatalities and high tissue levels of organochlorines was intriguing, but it was not proof of cause and effect. The proof came from researchers with the National Institute of Public Health in the Netherlands. Shortly after the Baltic seal epidemic, Dutch researchers captured 22 seal pups along the coast of Scotland and for two years, fed them their normal diet of herring. Half the pups ate herring caught in the relatively clean North Atlantic, while the other half's herring came from the industrially polluted Baltic. The Baltic herring had tissue levels of organochlorines 10 times higher than their Atlantic counterparts. Every other month, the researchers took blood samples from both groups and analyzed them for immune function. The immune systems of the pups fed Atlantic herring remained healthy. But the pups fed Baltic herring quickly showed impairment. Counts of their natural killer cells, specialized infection-fighting white blood cells, declined by almost half. Levels of other immune components, B cells and T cells, were also depressed. And the pups' vitamin A levels dropped 20 to 40 percent. Vitamin A plays a role in resistance to infection.



The Dutch researchers have not stopped eating fish. Organochlorines accumulate in fat tissue, and most fish are quite low in fat. Meanwhile, fatty fish, among them, herring and salmon, contain omega-3 fatty acids that appear to help prevent heart attack. However, the Dutch scientists do their best to make sure they don't eat fatty fish from polluted waters, especially from the Baltic.

In the wake of recent publicity on emerging viruses - not to mention the AIDS virus, which appears to have come from African monkeys - it has become fashionable to blame new infectious disease epidemics on human disruption of once-remote ecosystems, for example, the African and Amazonian rainforests. Dangerous new germs may, indeed, lurk in these areas, and rampaging deforestation and ecosystem disruption should certainly be curtailed.

However, infection requires not only a virulent pathogen, but also a vulnerable host with an immune system not up to self-defense. With their immune systems compromised by exposure to organochlorines, marine mammals are looking increasingly like the canaries that once warned coal miners of poison gasses - but with one important difference. Compared with canaries, marine mammals are biologically much closer to us.

Resources:

"Something's Fishy," by Janet Raloff, Science News, July, 2, 1994. Dioxin: The Orange Resource Book. \$7.00 from WD Press/Synthesis- Regeneration, P.O Box 24115, St. Louis, MO 63130.

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