

## Developmental and Cytogenic Abnormalities Induced in the Purple Sea Urchin by Environmental Levels of Benzo(a)pyrene

Jo Ellen Hose<sup>1,2</sup>, Harold W. Puffer<sup>1</sup>, Philip S. Oshida<sup>3</sup>, and Steven M. Bay<sup>3</sup>

<sup>1</sup>Department of Pathology, University of Southern California, Los Angeles, CA

<sup>2</sup>Vantuna Research Group, Department of Biology, Occidental College, Los Angeles, CA

<sup>3</sup>Southern California Coastal Water Research Project, Long Beach, CA

### ABSTRACT

The teratogenic effects of environmental levels of the mutagen, benzo(a)pyrene (BaP), were investigated using the purple sea urchin (*Strongylocentrotus purpuratus*) and were related to embryonic cytotoxicity and genotoxicity as evidenced by the presence of aberrant chromosome arrangements during mitosis. Developmental abnormalities were observed in gastrulae treated with initial BaP concentrations of 1 to 50 ng/ml relative to solvent (ethanol)-treated control embryos. However, genotoxic effects were significant at the lowest BaP dose tested, 0.5 ng/ml. When compared to seawater and ethanol control embryos, fewer mitotic figures and increased frequencies of abnormal mitoses were present in BaP-treated gastrulae. Micronucleus formation, a widely used test of genotoxicity in mammals, was observed in embryos exposed to 1 to 50 ng/ml BaP. Grossly abnormal test embryos had high incidences of mitotic aberrations and were composed of large numbers of pycnotic, karyolytic, and multinucleated cells. The results from this cytogenetic analysis demonstrate that mitotic inhibition and aberrations are more sensitive indicators of BaP-induced damage than are developmental effects and suggest that cytogenetic analysis is particularly suited for use with invertebrates and appears to be as sensitive as more laborious and expensive routine cytogenetic methods which involve karyotyping such as the sister chromatid exchange test.

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