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BPA Study Report Card

The criteria identified in this Report Card have been established by the National Institute for Environmental Health Sciences (NIEHS) for use in evaluating research studies funded by the agency. The NIEHS criteria were developed in 2009 to provide the best parameters for assessing human health effects of BPA.

Study Meets Criteria	Study Criteria Unknown or Not Applicable	Study Fails Criteria

Study: The effects of in utero bisphenol A exposure on reproductive capacity in several generations of mice
Authors: Ayelet Ziv-Gal, Wei Wang, Changqing Zhou, Jodi A. Flaws
Journal: Toxicology and Applied Pharmacology

CRITERIA	SCORE	COMMENTS
Diet must not interfere with the sensitivity of the model to BPA.		Teklad Rodent Diet 8604 contains some estrogenic compounds, and does not appear to have been analyzed for possible BPA contamination.
Species and strain of animals (must be sensitive to estrogenic chemicals at low doses).		Sensitivity of FVB mice to estrogenic effects is not discussed/uncertain.
Sufficient sample size.		For some treatment groups, only 1 or 2 dams were evaluated; others had as many as 13-15.
Internal dose of BPA (total and free BPA should be measured in blood and if possible also in urine throughout the study).		No internal BPA measurements were collected.
Dose responses (single dose experiments are not acceptable).		Study evaluated 3 BPA doses (0.5, 20, and 50 µg/kg-d), as well as vehicle and positive (DES) controls. However, there is no consistency or coherence in the dose-response and timing of the various effects that were observed.
Phenotype (endpoint must be an actual phenotype, disease/dysfunction not just toxicity).		Endpoints with significant effects (vaginal opening, first estrus) are measures of dysfunction.
Litter must be used as statistical unit for developmental exposures.		Study was designed to assess reproductive (not developmental) effects.
Route of exposure should be oral or justified to provide similar blood levels as oral route.		
Males and females should be used when feasible.		This study was designed to evaluate female reproductive effects, and thus only female endpoints were measured.
Molecular targets and mechanism should be assessed when possible including gene expression, receptor binding and epigenetic studies. These effects should be linked to the exposure and the disease/dysfunction endpoints.		No molecular target or mechanism data were collected.

Note: This study is generally well-designed, but there are a couple of critical issues that complicate interpretation of results. These include a lack of coherence and consistency in observed effects across generations, doses, and time points. It is possible this lack of consistency is related to the second issue--the small sample size (n = 1-3 dams) for some of the effects evaluated.