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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: *In Vitro* Effects of Bisphenol A β-D-Glucuronide (BPA-G) on Adipogenesis in Human and Murine Preadipocytes
Authors: Jonathan G. Boucher, Adèle Boudreau, Shaimaa Ahmed, and Ella Atlas
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CRITERIA	SCORE	COMMENTS
Diet, must not interfere with the sensitivity of the model to BPA		*In vitro* study.
Species and strain of animals, (must be sensitive to estrogenic chemicals at low doses)		*In vitro* study.
Sufficient sample size		Depending on the assay, the data is representative of 3-6 separate experiments, which is reasonable for *in vitro* assays.
Internal dose of BPA (total and free BPA should be measured in blood and if possible also in urine throughout the study)		*In vitro* study.
Dose responses (single dose experiments are not acceptable)		The majority of assays used multiple doses ranging from (0.01-10 uM). However, there were some assays that only used the highest dose (10 uM).
Phenotype (endpoint must be an actual phenotype, disease/dysfunction not just toxicity)		The endpoint is adipocyte differentiation, which is not in itself a phenotype or disease/dysfunction.
Litter must be used as statistical unit for developmental exposures		*In vitro* study.
Route of exposure should be oral or justified to provide similar blood levels as oral route		*In vitro* study; also used doses that are more than 1.8-1,800 times higher than normal human BPA-G serum levels using conservative estimates (Teeguarden *et al.*, 2011).
Males and females should be used when feasible		*In vitro* study.
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		The authors assessed gene and protein expression and transcriptional activity . However, given that effects mainly occurred at the highest doses tested, which was 1,800 times higher than normal human serum BPA-G levels, it is uncertain whether this mechanism would apply at lower doses.

Note: While the objective of the study was to elucidate the mechanism for some of the health effects that have been linked to BPA exposure (namely obesity), it does not provide information that is useful for BPA risk assessment due to the *in vitro* system used and the high doses employed. Furthermore, the study lacked an important control, such as UDP-glucuronide, for BPA-glucuronide treatment in order to conclude if the effects are due to the BPA metabolite. It is uncertain whether the results are applicable to exposures encountered in the general population.