

## CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s)	Project Number
Amy X. Zhong	
	38591
Project Title	$O \longrightarrow$
Plastice Destroying Vour DNA, An Inquiry into the D I An Inducing	
Plastics Destroying Your DNA: An Inquiry into the R-Loop Inducing	
Behaviors of Bisphenol A and Its Implications	
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Abstract	
Objectives/Goals Abstract	
Bisphanol A (BBA) is a plastic monomor used in nearly every form of plastic	skaging BPA is known to
be an estrogen disruptor and imitator, which has massive potential implications	for our public health and
safety Estrogen can cause R-loops, a three-stranded nucleic acid structure com	posed of a single-stranded
DNA and a DNA RNA hybrid which often causes DNA double-strand breaks	<b>DBs</b> ) I wanted to know
bisphenol A (BFA) is a plastic monomer used in hearly every form of plastic p be an estrogen disruptor and imitator, which has massive potential implications safety. Estrogen can cause R-loops, a three-stranded nucleic acid structure comp DNA and a DNA:RNA hybrid, which often causes DNA double-runnd breaks whether BPA also poses similar threats to our genomes by causing R loops in o wanted to investigate the effects of BPA on ER-positive breast cancer cells, pa R loop formation and cell visibility to theraporties	UT DNA Specifically I
wanted to investigate the effects of BPA on FR-nositive breast cancer cells na	ticularly focusing on
R-loop formation and cell viability to therapeutics.	licularly locusing on
Methods/Materials	
Cells were treated with BPA and/or A-hydroxytamovifen and cells university	determined using XTT
Cells were treated with BPA and/or 4-hydroxytamoxifen, and cell survival was assays. Growth inhibitory properties were analyzed using GraphPad software to lysate was prepared from treated cells and run on SDS polyecrylamide gel elect analysis. Nucleic acid from treated cells was spotted duto Nylos membrane usin membrane usin	determine the EC50 Cell
lysate was properted from trasted calls and run on SDS polyager lamids gol alog	rophorosis for western blot
analysis. Nucleic acid from tracted cells and full of SDS polysis yailing ger elect	a slot blot apparatus and
analysis. Nucleic acid from treated cells was spotted anto Nylox menorate usin probad with antibadiag. The treated cells ware also five and probad with antib	ig a slot blot apparatus and
probed with antibodies. The treated cells were also fixed and probed with antibo	Dates following
immunostaining procedures.	
MCE7 calls tracted with DDA have long and ration rates while a 4 10 fel	dinamaga in Dlaan
MCF7 cells treated with BPA have higher provideration rates exhibit a 4-10 fold	f calls containing
formation, elevated levels of DNA double strand breaks, and high percentages of cells containing	
micronuclei. I also found that MCF7 cells are more resistant to 4-hydroxytamoxifen agents when cultured in BPA containing medium. The 4-hydroxytamoxifen treatment follows the typical Hormetic dose-response curve, where low doses of 4-hydroxy Tamoxifen promote MCF7 cell growth and at higher doses of 4 hydroxy Tamoxifen inhibit cell prowth	
In BPA containing medium. The 4-hydroxytanoxhen treatment ronows the typ	ical Hormetic
doses of 4 hydroxy Temovifen inhibited provide	
uoses ol 4-nyuloxy ranoxiten innoit en stowu.	
Conclusions/Discussion	
My results snow that BPA, in concentrations relevant to average consumers and	i plastics workers around
My results show that BPA, in concentrations relevant to average consumers and the world, causes R-loop formation DNA loudle-strand breaks, and checkpoin could be a mutagen. This is participarly important for those who would be more	t activation, and therefore,
could be a mutagen. This is participarity important for those who would be more susceptible to these acute	
responses to BPA, such as children and the elderly. These results call for a more plastics, not just for environmental reasons, but also for the potential health risk Constant DNA damage. especially from double-strand breaks caused by R-loop	e responsible use of
plastics, not just for environmental reasons, but also for the potential health risk	s to our population.
Constant DNA damage especially from double-strand breaks caused by R-loop	s, is a crucial component
in the development of oncer.	
Summary Statement	
My study analyzes and reveals the effects of Bisphenol A on the formation of R	
damage, which leads to weakened genomic integrity and a higher risk of cancer	
Help Received	
Used lab facility for my own individual project at UC Irvine under the supervision of Dr. Phang-Lang	
Chen.	