

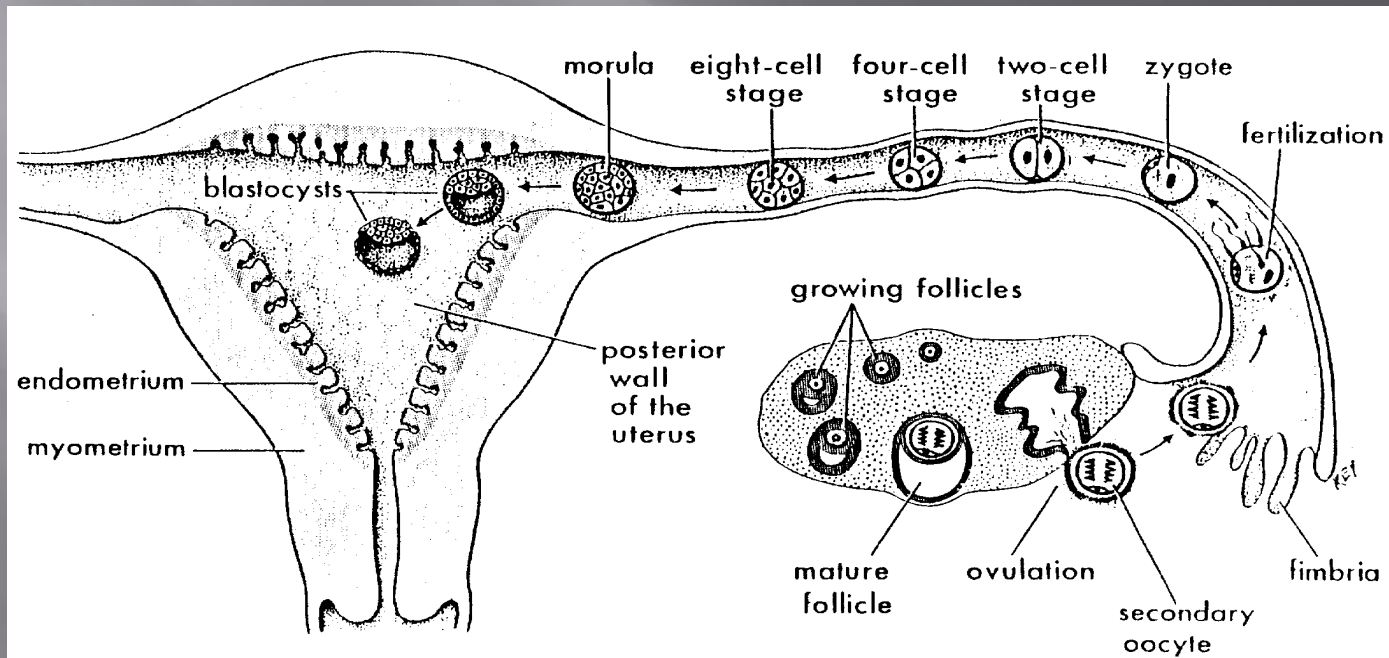
BISPHENOL A AND REPRODUCTION

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Periconceptual Exposures: Development Begins at Fertilization





Human exposure



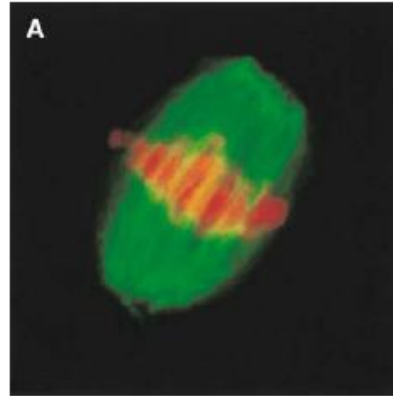
- Dietary intake
 - Plastic bottles (including baby bottles) & metal-based food & beverage cans
 - Cardboard Cartons
- Environment
 - Air, dust & water
 - Possible source
- Dental sealant
 - Short-term exposure
- Thermal receipts and paper \$\$
- Low levels of human exposure to BPA
 - Standardized toxicity tests

Bisphenol A Exposure Causes Meiotic Aneuploidy in the Female Mouse

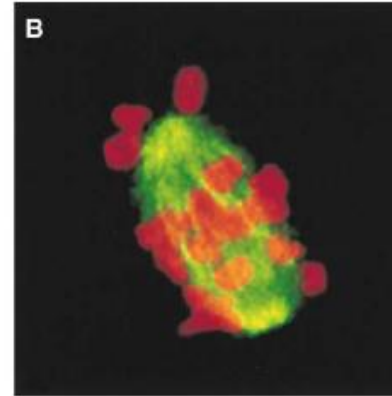
- ▣ In the course of meiotic studies of mouse oocytes in 1998, a sudden and dramatic increase in oocytes exhibiting gross disturbances in chromosomal alignment on the meiotic spindle (Congressional Failure)
- ▣ Typically, 1-2% of murine oocytes exhibit congressional failure at metaphase I
- ▣ In experiments conducted in August 1998, 40% of control oocytes exhibited congressional failure

Normal and Abnormal Metaphase Configurations

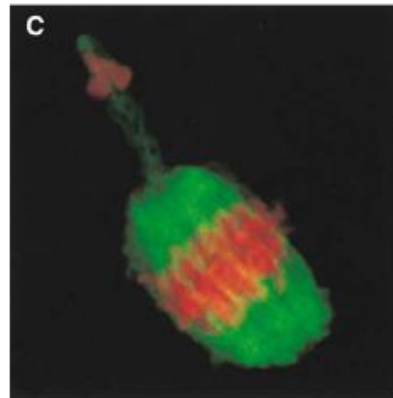
A. Normal MII Configuration



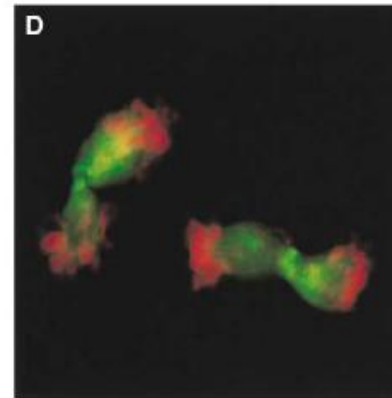
B. Congressional Failure in MII Oocyte



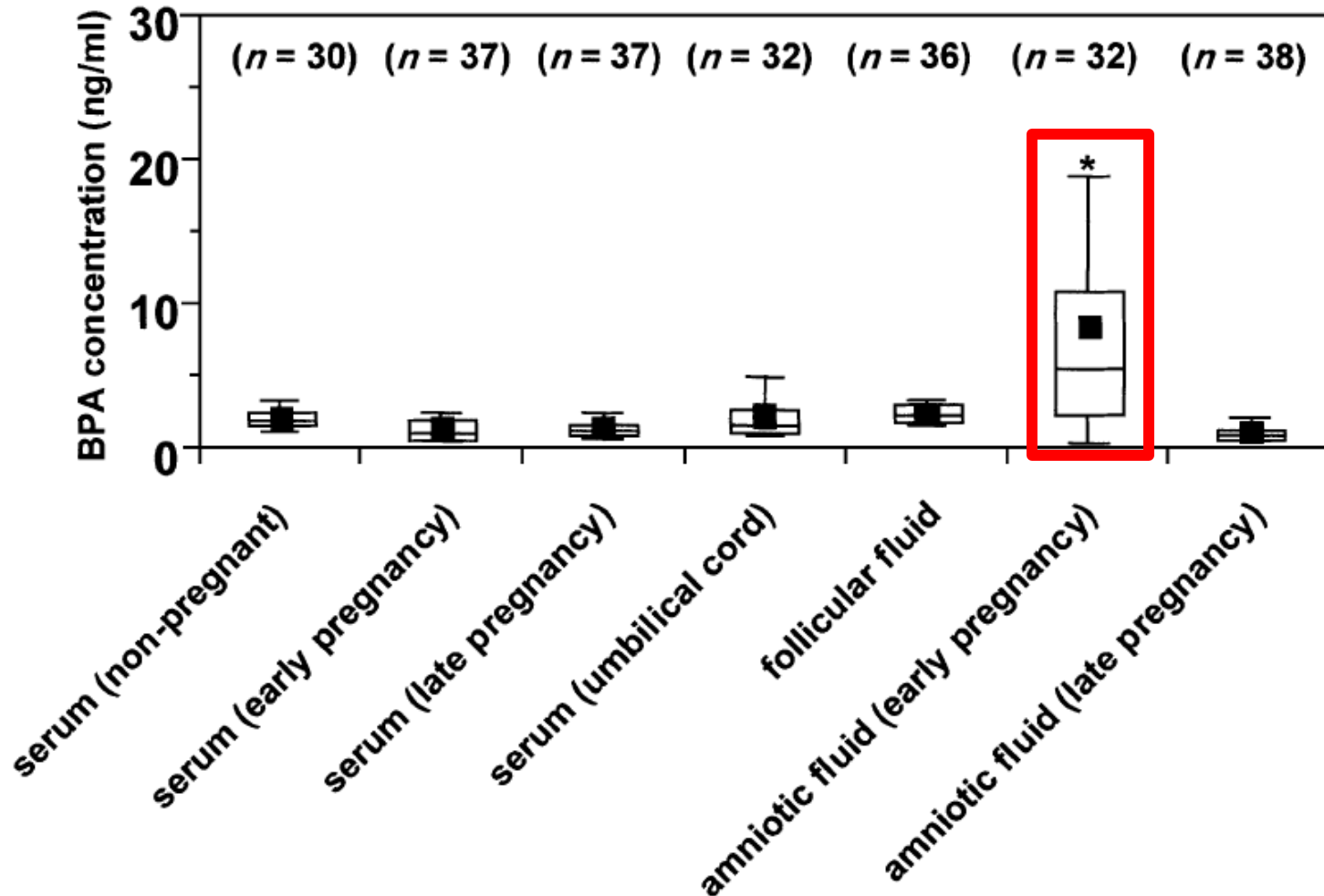
C. MI with chromosomes ejected from spindle



D. A cell that should be undergoing Meiosis I but two groups of chromosomes seen



Bisphenol A levels in various Reproductive Fluids

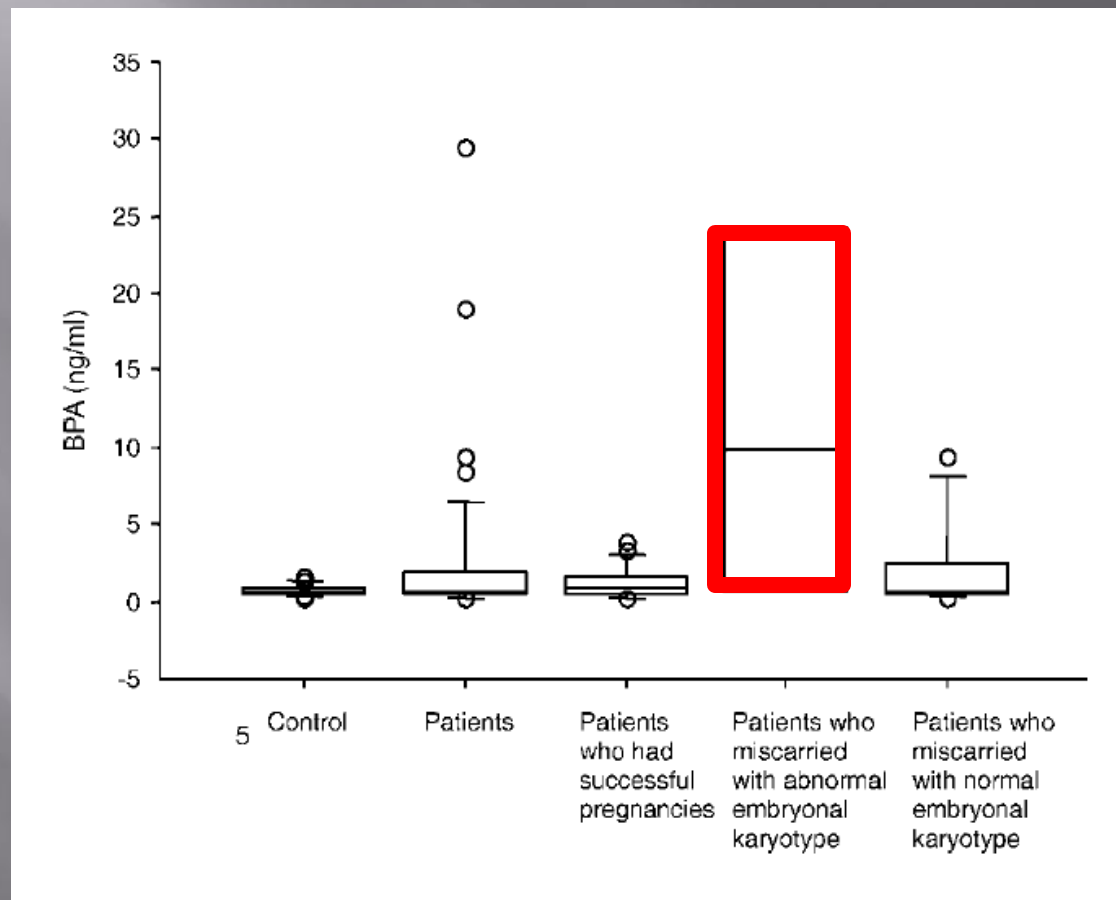


Bisphenol A exposure and Recurrent Miscarriage

	Patients (n = 45)	Controls (n = 32)	P-values
Age (years)	31.6 ± 4.4	32.0 ± 4.8	NS
No. of previous miscarriages	4.0 ± 1.7	0	
BMI	20.9 ± 2.7	20.81 ± 2.25	NS
Place of residence	Nagoya	Nagoya	
Occupation	Housewives 20 Office workers 17 Teacher 3 Medical co-workers 3 Gardener 1 Worker in industry 1	Medical co-workers	
Bisphenol A Mean (SD)	2.59 ± 5.23	0.77 ± 0.38	0.024
Range	0.22–29.43	0.20–1.58	
Median	0.71	0.705	
Quartiles	1.403	0.415	

Values are means ± SD.
BMI = body mass index (kg/m²).

Bisphenol A exposure and Recurrent Miscarriage



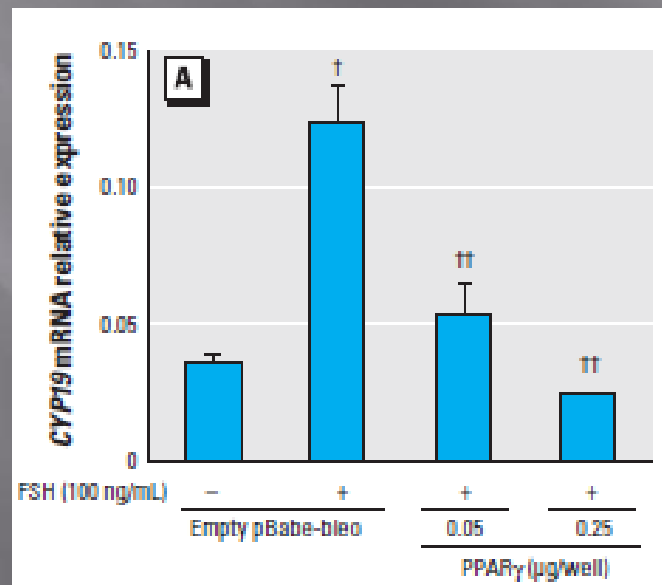
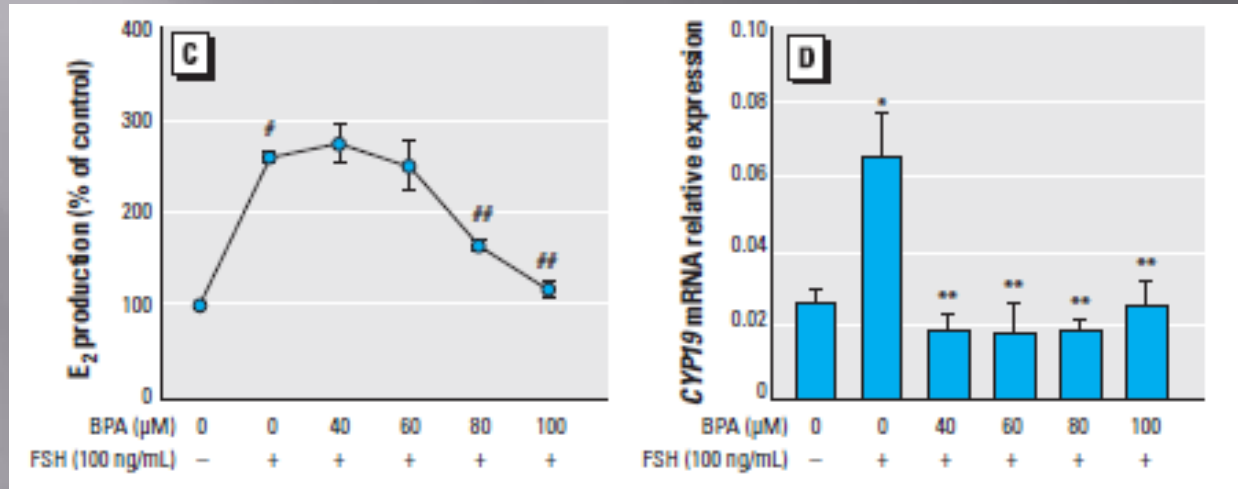
Bisphenol A exposure and number of oocytes retrieved during IVF

Table 5 Poisson model for the association of urinary BPA concentrations with number of oocytes retrieved, after adjusting for age, BMI and day 3 FSH levels and accounting for multiple IVF cycles

Variable	Incidence Rate Ratio	95% Confidence Interval	p-value
Ln(SG-BPA)	0.88	(0.77, 0.96)	0.007
Age	0.99	(0.96, 1.01)	0.34
BMI	1.00	(0.98, 1.02)	0.92
Day 3 FSH	0.91	(0.86, 0.95)	<0.0001

Ln, natural logarithm; SG-BPA, specific gravity-adjusted bisphenol A; FSH, follicle-stimulating hormone; IVF, in vitro fertilization; BMI, body mass index.

Bisphenol A and Inhibition of Aromatase Activity in Human Granulosa Cell Line



Kwintkiewicz et al, Environ Health Perspect 118:400-406, 2010

BISPHENOL A AND PERICONCEPTUAL EXPOSURES

These background studies prompted Dr. Bloom and I to incorporate bisphenol A as an environmental contaminant of interest into our SMART (Study of Heavy Metals in Assisted Reproductive Technologies) study