

Health Effects of Plastics

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Precautionary Principle:



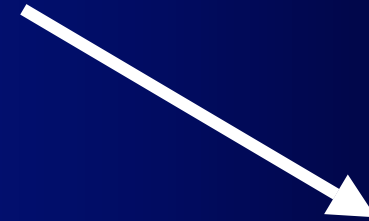
When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. The proponent of an activity, rather than the public, should bear the burden of proof.



Life cycle of plastics



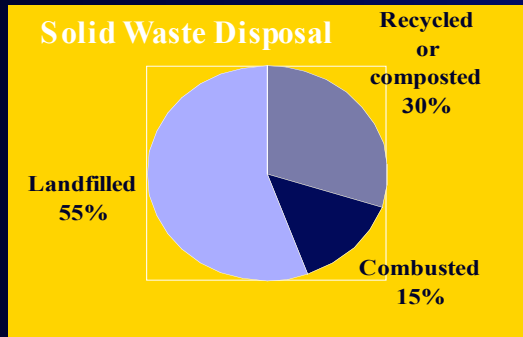
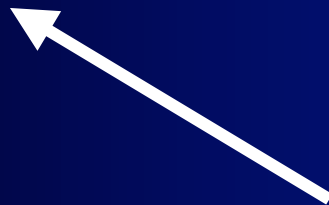
**Plastic Resin
Production**



**Product
Fabrication**



Period of Service



Elimination

Hazardous materials created during plastics production



Chemicals used or produced in making plastics are highly toxic

- Carcinogens
- Damage nervous system, blood, kidneys, etc.
- Vaporize & pollute air
- Flammable
- Explosive

(Tuberoose.com)

Types of plastics additives

- Antimicrobials
- Antioxidants
- Antistatic agents
- Blowing agents
- Catalysts/curing agents
- Colorants
- Fillers
- Flame retardants
- Free-radical initiators
- Heat stabilizers
- Impact Modifiers
- Lubricants/mold releasers
- **Plasticizers**
- Reinforcers
- Ultraviolet stabilizers



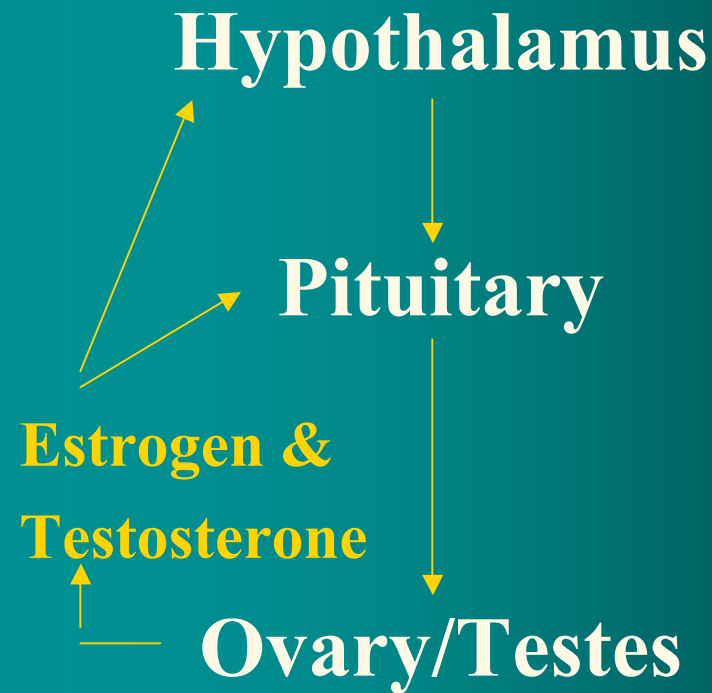
DEHA Controversy

- ✓ **Estrogenic & carcinogenic in some lab animals.**
- ✓ **FDA says levels are safe.**
- ✓ **EPA removed DHEA from list of “toxic chemicals” - now lists as “possible human carcinogen.”**
- ✓ **EU limits amount of migrated DEHA, yet some US cheeses greatly exceed EU limit.**



(Consumer Reports, 1998)

Regulation of Sexual Function



“Hand-me down poisons”

Effect of DEHP on rat testes

(J.Ostby, 2000/EPA)



Control

DEHP

DEHP

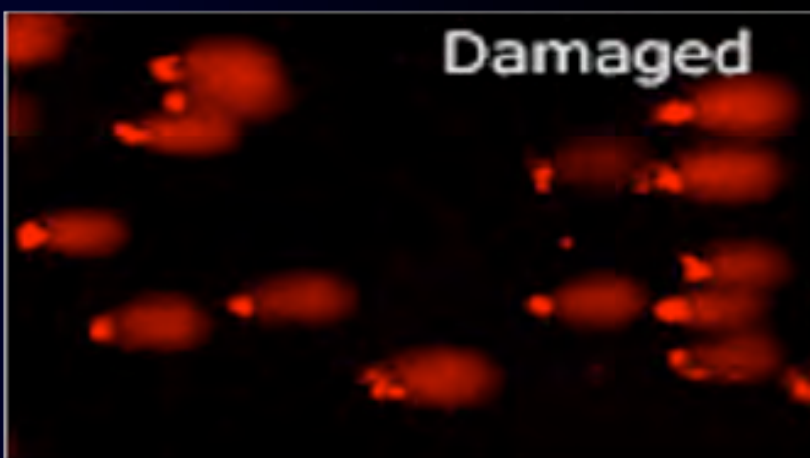
Pre-natal DBP exposure in rats

Epididymis (sperm-storing organ) from an adult rat exposed to the phthalate DBP in the womb is 1/3 the size of normal.



(LE Gray, Jr., 1999)

Phthalates associated with human sperm abnormalities



- Male fertility decline.
- U.S. population exposure to phthalates is widespread.
- Sperm abnormalities due to phthalates might be widespread in American men.

(Duty et al., 2003)

Human Male Infertility

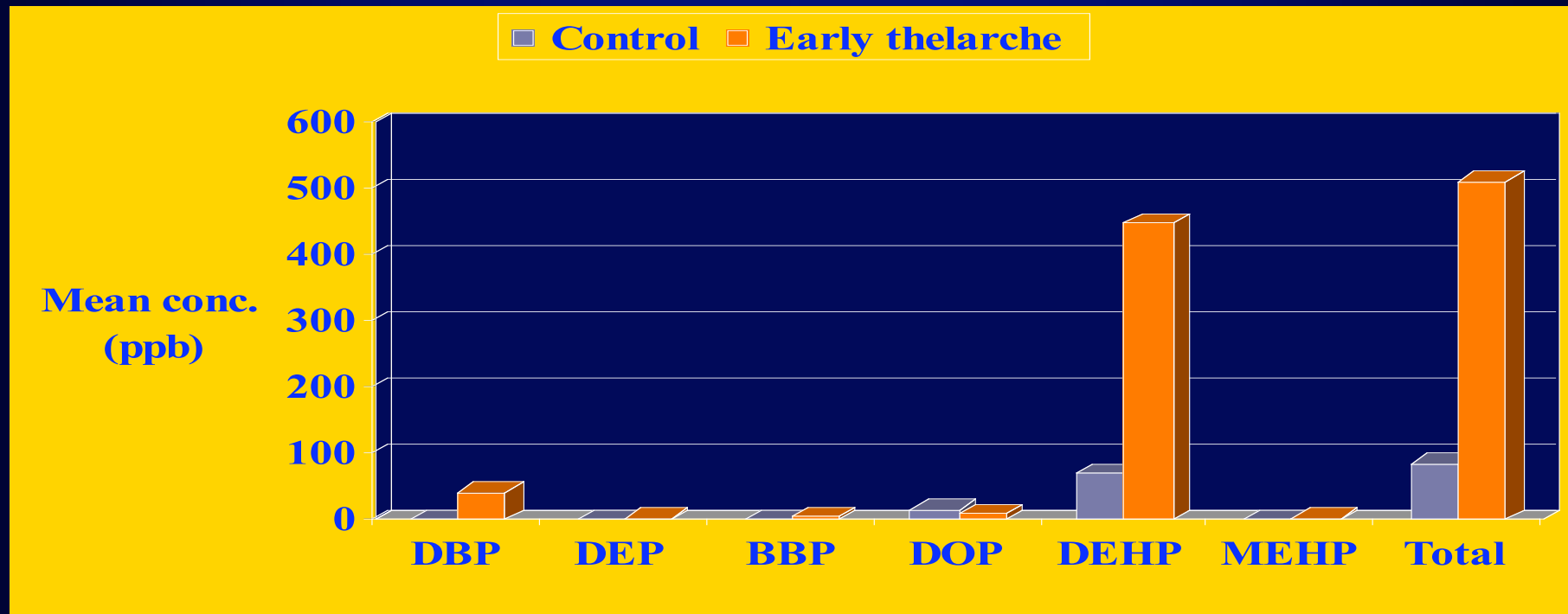


“Testicular Dysgenesis Syndrome”

- ✓ Poor sperm quality
- ✓ Testicular cancer
- ✓ Undescended testis
- ✓ Hypospadias

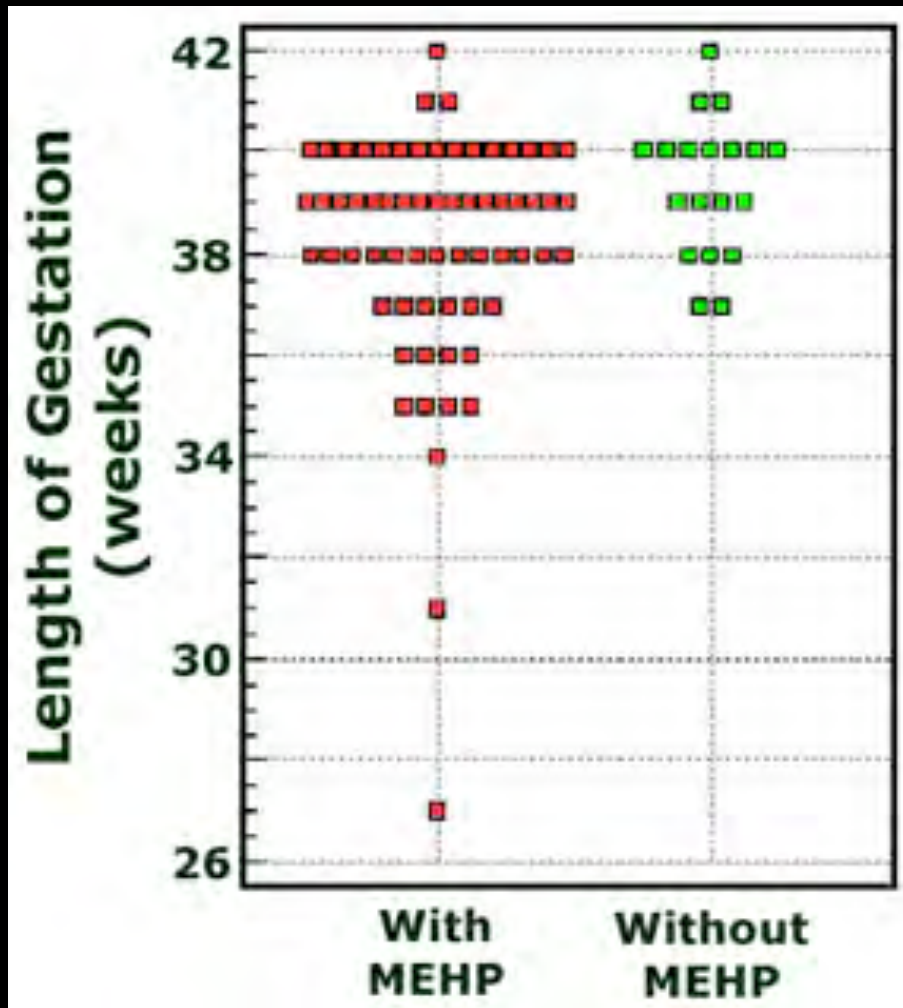
(Skakkebaek, 2003)

DEHP & premature puberty in Puerto Rican girls



(Colon et al., 2000)

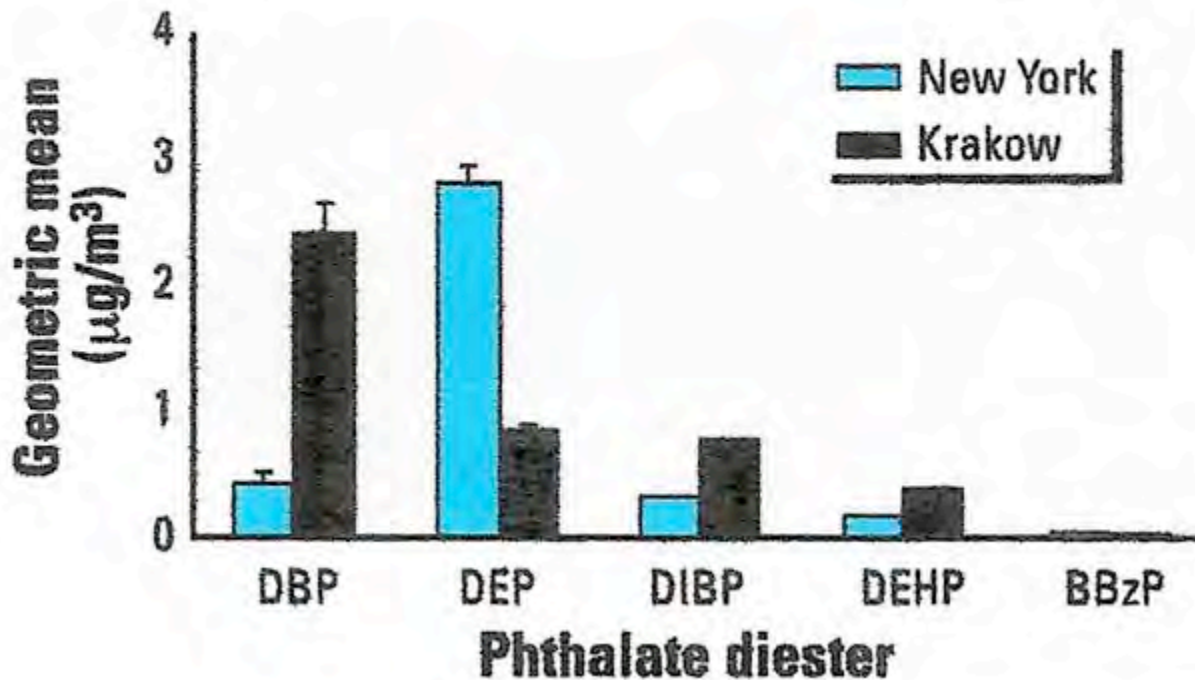
DEHP shortens pregnancy



- DEHP (&MEHP) were widespread in cord samples of newborns in an Italian hospital.
- Infants with MEHP had 1 week shorter gestation.
- Premature births in U.S. have risen 23% since 1980s.

(Latini et al., 2003)

Phthalate Inhalation in Pregnant Women



(Adibi et al., 2003)

DEHP implicated in childhood asthma

- Asthma rates increasing in children in recent decades.
- Risk of asthma in toddlers is related to amount of PVC flooring in the home.
- 2 – 8 yr olds with asthma have higher levels of DEHP in bedroom house dust.



(Jaakola et al., 1999; Bornehag et al., 2004)

Greenpeace campaigns against phthalates in toys and IV bags



CA lists DEHP as reproductive toxin under Prop 65



- * Listed as reproductive toxin, June 2004, by OEHHA.
- ** Warning labels mandatory in one year
- *** DEHP *was* listed as carcinogen until 2001

Phthalates

...the most abundant man-made pollutants in the environment

...18 billion lbs/yr produced worldwide*

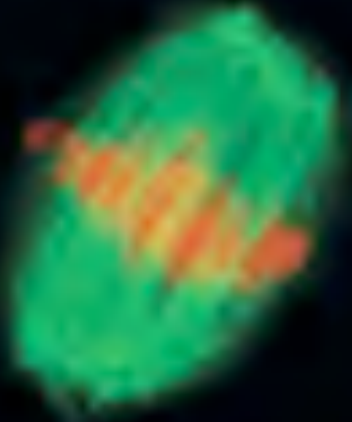
...widespread in air, water, soil, foods & humans*

*Blount et al., 2000

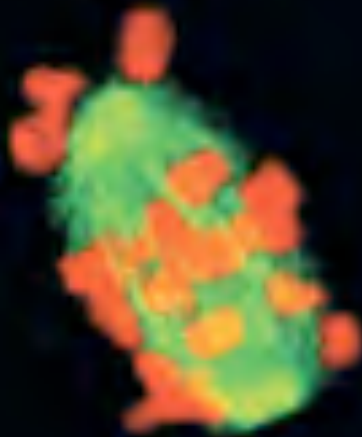
*Agency for Toxic Substances and Disease Registry, 2000; Centers for Disease Control and Prevention, 2003; Petreas and Briendahl, 2000)



Chromosomal Damage caused by Bisphenol-A



- **Bisphenol-A** from drinking water bottles produced *aneuploidy* = oocytes with abnormal chromosome number.



- Exposure was near or below levels considered safe.

(Hunt et al., 2003)

Teflon® AF Processing Safety and Precautions

WARNING!



**“VAPORS CAN BE LIBERATED
THAT MAY BE HAZARDOUS TO
YOUR HEALTH IF INHALED”**



Advertising by the *American Plastics Council*

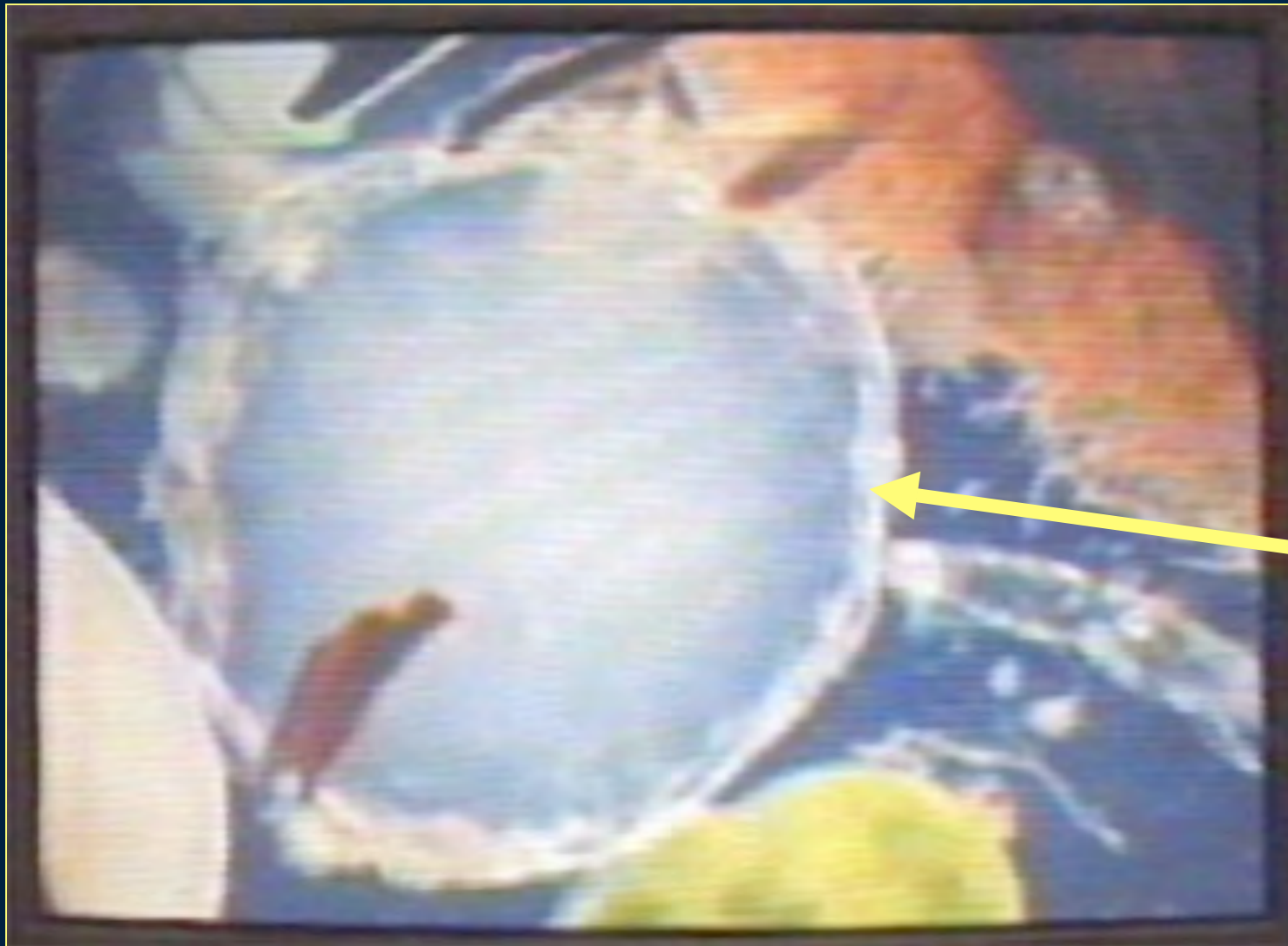


- Plastics: An Important Part Of Your Healthy Diet
- You could think of them as the sixth basic food group

Fires release dioxins

- PVC is ubiquitous in building materials.
- Burning PVC releases dioxins.
- Solid waste is routinely incinerated in undeveloped countries that lack landfills.

Plastics concentrate oily toxins



Surface
of the
nurdle

Microplastics Contamination



(Thompson et al., 2004)