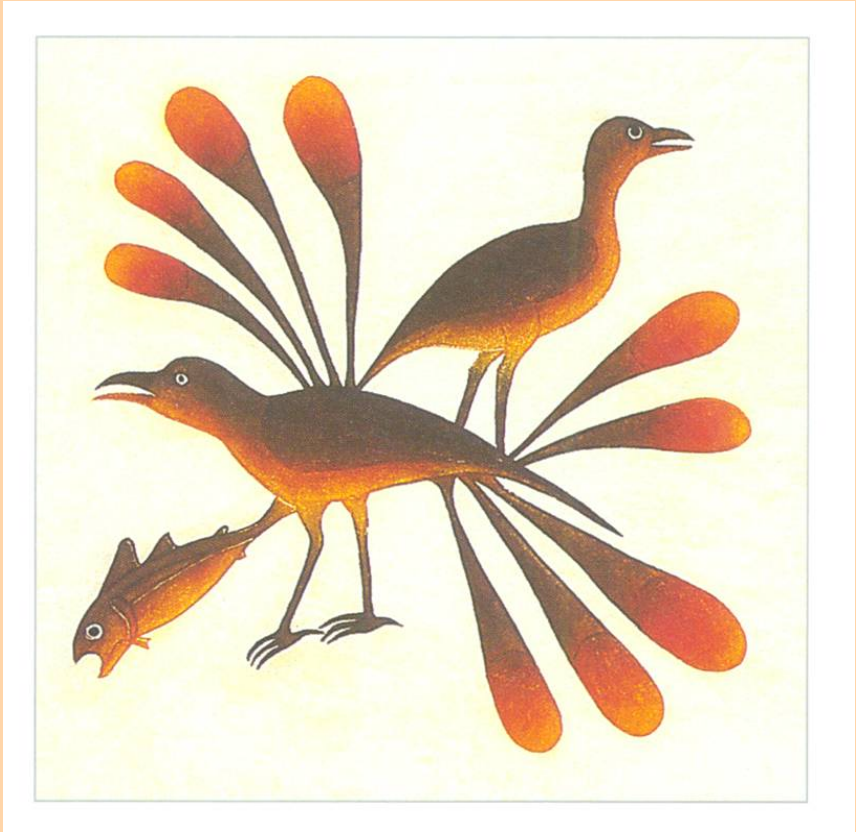
Methodology to evaluate endocrine disruptors



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Dr. Theo Colborn of the World Wildlife Fund gathered a group of scientific experts in the fields of developmental biology, reproductive toxicology, zoology, immunology, marine biology and ecology to address the issue that: "a large number of man-made chemicals that have been released into the environment … have the potential to disrupt the endocrine system of animals, including humans."

The complexity of the problem

- A single chemical but… many targets.
- Examples:
- BPA → ER → Estrogenic
  - BPA → AR → Androgen antagonist
  - BPA → Thyroid Receptor → Thyroid antagonist
- DDT → ER → Estrogen agonist
  - DDT ⇢ DEE → Estrogen antagonist
    - DEE → Androgen antagonist

The complexity of the problem

- Many chemicals but… a single effect.
- Examples:
- Estradiol-17β → ER → Estrogenic*
- BPA → ER → Estrogenic*
  - AR → Androgen antagonist
  - Thyroid Receptor → Thyroid antagonist
- DDT → ER → Estrogen agonist*
  - DEE → Estrogen antagonist
  - DEE → Androgen antagonist

The complexity of the problem

- What is the importance of identifying the “internal dose”?
- Why is the Total Xeno-Estrogen Burden (TEXB) relevant when testing mixtures?
- How to assess a dose-response curve (non-monotonic)?
- Do effects vary depending on the stages of development at which XE strike?
- Who should be responsible for the decision to release chemicals that turn out to be EDs?

  a) the manufacturer, b) regulatory agencies, and/or c) the public?

CONCLUSIONS

- Who should bare the “burden of proof” for the safety of harm of a new chemical introduced into commerce?
- At what point the research and/or development of a new product should be arrested to prevent harm?
- These become socio-political matters beyond the control of scientists.

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