

Endocrine Disrupters

Objective: To learn the effect of household chemicals on the human body

Introduction: Common household chemicals found in cosmetics or cleaners may have significant biological effects in the human body but companies are not forced to disclose them. This lesson aims to introduce students to some of those potential effects and their mechanisms of action.

Curriculum Connections:

Unit A

Unit B

Unit C – human activity leading to mutations and cancer

Supplies / Materials:

- Bottles of cleaning supplies and cosmetics or pictures of labels of these things

Hook: "The Dirty Dozen"

<https://www.youtube.com/watch?v=Eju1KqipMyc>



SCIENCE FOCUS

Lesson Subject

Biology 30

Topic

Endocrine and Nervous Systems

Location

Classroom

Length

60 mins for initial activities + time for individual student work or projects (10 – 50 mins)



Intro Activity: Have students look at the ingredient lists on cosmetic products or cleaning supplies. Alternatively, if you don't have products or labels available divide the information from "the dirt on toxic chemicals" article below into sections and assign to groups of students to look over. Ask them to look for vocabulary that describes the effect of these chemicals on our health (e.g. carcinogen, endocrine disruptor, irritant etc.)

Main Activity:

1. Review what the students know about endocrine function. What are some of the hormones they know about? How do these hormones affect the human body?
2. Let students know they will focus on endocrine disruption for this lesson. Brainstorm what they think the term "disruption" could mean to a cell, organ or human body.
3. Have students work in small groups to create an image for how they think endocrine disruptors work or look at an image and describe what is happening. What do they think having endocrine disruptors in cleaners and/or cosmetics could be doing to human health?

Independent Student Work: (assign one or more as in-class work or as a project)

- 1) Have students define terms related to human health in science notebooks. The terms can include *carcinogen*, *endocrine/hormone disruptor*, *reproductive toxins* and *neurotoxicity*. (These terms were selected from the David Suzuki Foundation articles, your class may brainstorm more terms they wish to have defined).
- 2) Have students come up with their own schematic for endocrine disruption
- 3) Have students brainstorm which products in their own homes could lead to endocrine disruption
- 4) Have students research specific endocrine disruptors and the systems they effect

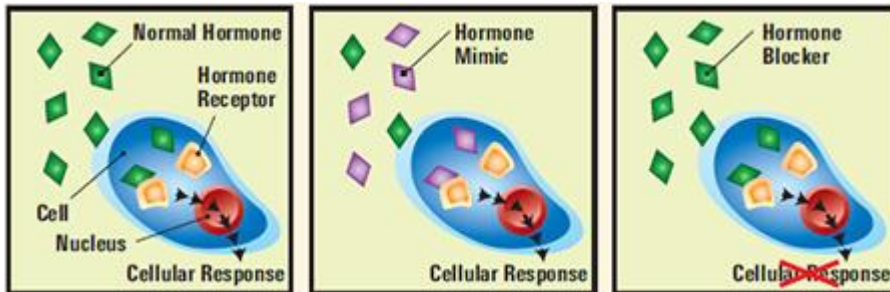
Conclusion / Review: Ask if students were surprised by what they learned. Ask them why they think these chemicals may be allowed and whether they think they are a problem / how big of a problem.

Homework: Have students write a letter to federal politicians requesting better labeling systems, citing scientific evidence for the need based on endocrine function. See CESD petition below for examples.

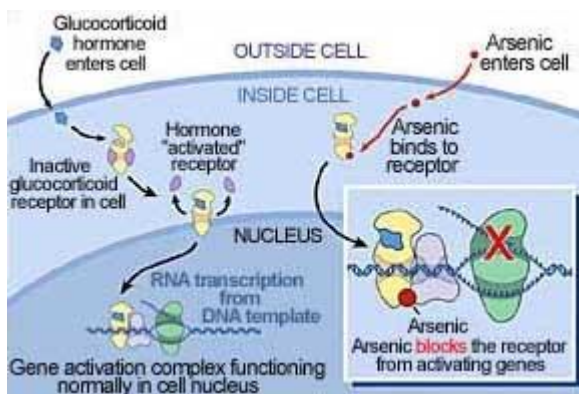
Resources:

- 1) <http://www.dauidsuzuki.org/issues/health/science/toxics/the-dirt-on-toxic-chemicals-in-household-cleaning-products/>
- 2) <http://www.dauidsuzuki.org/media/news/downloads/2011/CESD-petition-cosmetics-2011-01-18.pdf>
- 3) <http://dauidsuzuki.org/issues/health/science/toxics/dirty-dozen-cosmetic-chemicals/>

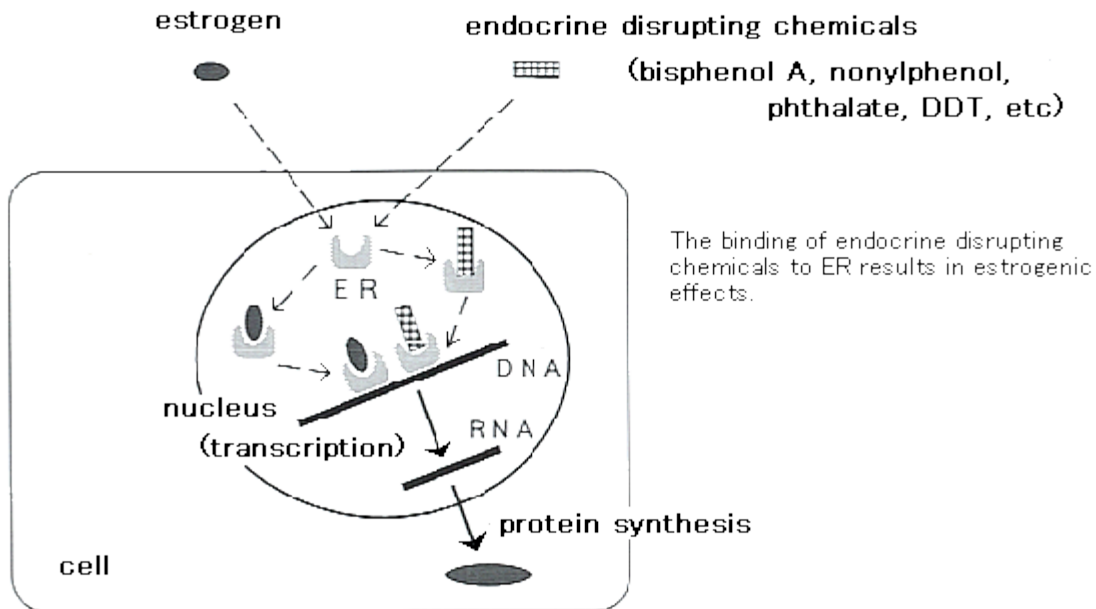
Sample Images:



From: <http://www.niehs.nih.gov/health/topics/agents/endocrine/>



From: <http://www.mindfully.org/Pesticide/Arsenic-ED-Heavy-Metal.htm>



From: <http://www.env.go.jp/en/chemi/ed/speed98/sp98f3a.gif>

Extension:

1. Have students research the dirty dozen of cosmetics (see resources) and try to determine which products they use may contain chemicals and if there are healthier alternatives
2. Discuss/research the effect of endocrine disruption on wildlife – link to unit D e.g. <http://www.ncbi.nlm.nih.gov/pubmed/10680769>
3. Have students compare conventional and alternative cleaners using agar plates and bacterial swabs.