

# ENDOCRINE SOCIETY



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*Hormone Science to Health*

# Identifying EDCs for Public Health Protection: The Endocrine Perspective

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# Introduction

Over 18,000 members – rapidly growing

122 Countries, 40% from outside US

World's leading experts in Hormone Research

ENDOCRINE  
SOCIETY





ACOG  
THE AMERICAN COLLEGE  
OF OBSTETRICIANS  
AND GYNECOLOGISTS



Royal College of  
Obstetricians  
and Gynaecologists



World Health  
Organization



American Chemical Society

## EDCs are a global health threat

Diabetes

Metabolic

Neurobehavioral

Reproduction

Immune deficiencies

Birth Defects

IQ loss

Cancers

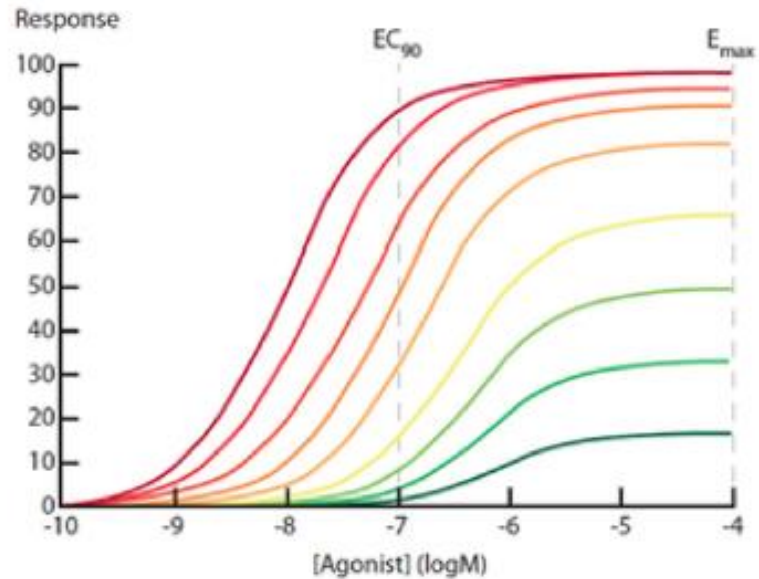
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# Hormones:

- Act on receptors
- Control development
- Act at low concentrations

**B**



Receptor number (% total)



# Critical features of hormone action

1. Outcome – population and individual level  
Adverse = risk factors for chronic disease
2. Timing of exposure – defines outcome.
3. Permanence – effects are irreversible.

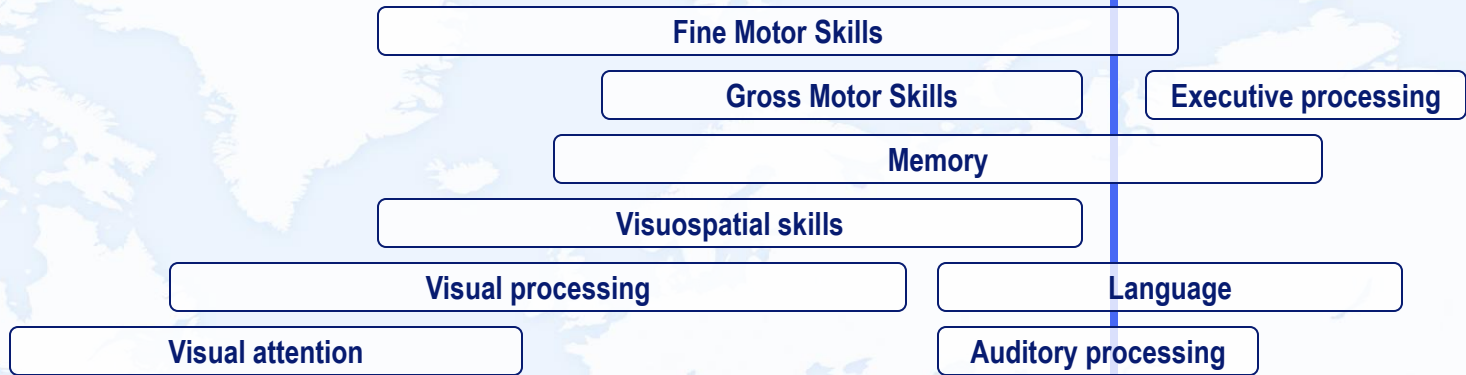
# Thyroid Hormone and brain development:

Synthetic chemicals can interfere with thyroid hormone action in the developing brain without changing hormone levels in the blood.

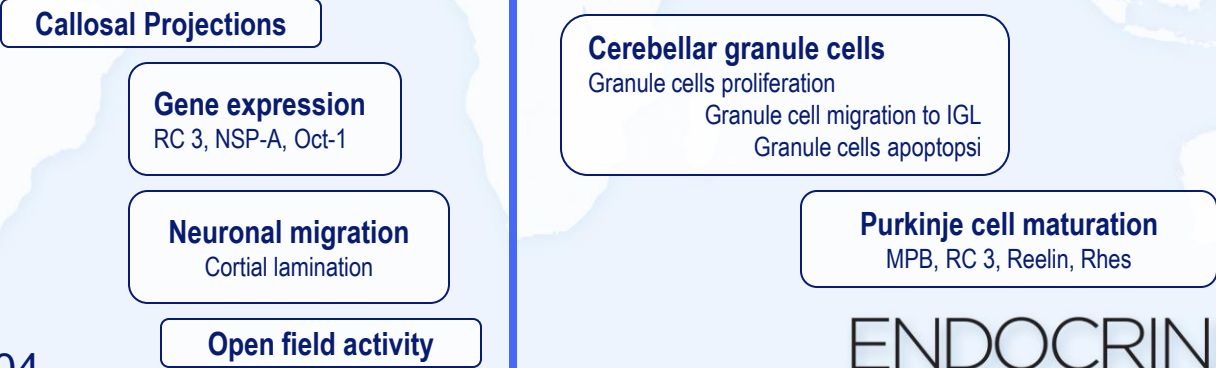


# HUMAN DEVELOPMENT

**BIRTH**



| FIRST TRIMESTER        | SECOND TRIMESTER | THIRD TRIMESTER          | POSTNATAL |
|------------------------|------------------|--------------------------|-----------|
| <b>Thyroid Hormone</b> |                  | <b>Brain Development</b> |           |
| G1-G17                 | G17-G21          | POSTNATAL                |           |



**BIRTH**

# RODENT DEVELOPMENT

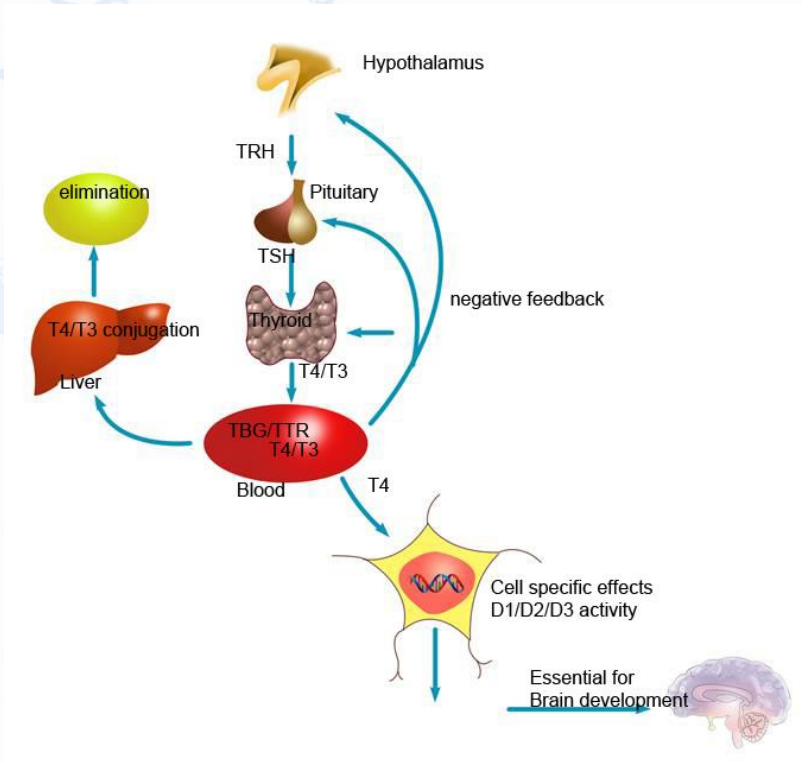
Zoeller & Rovet, 2004





# Conclusions

- Thyroid hormone is important.
- But, no mammalian endpoints of TH action in current screens/tests
- No compensation



# Thyroid is but one hormone system

- Gonad
- Adrenal
- Kidney
- Pancreas
- Muscle
- Gut
- Brain
- Heart

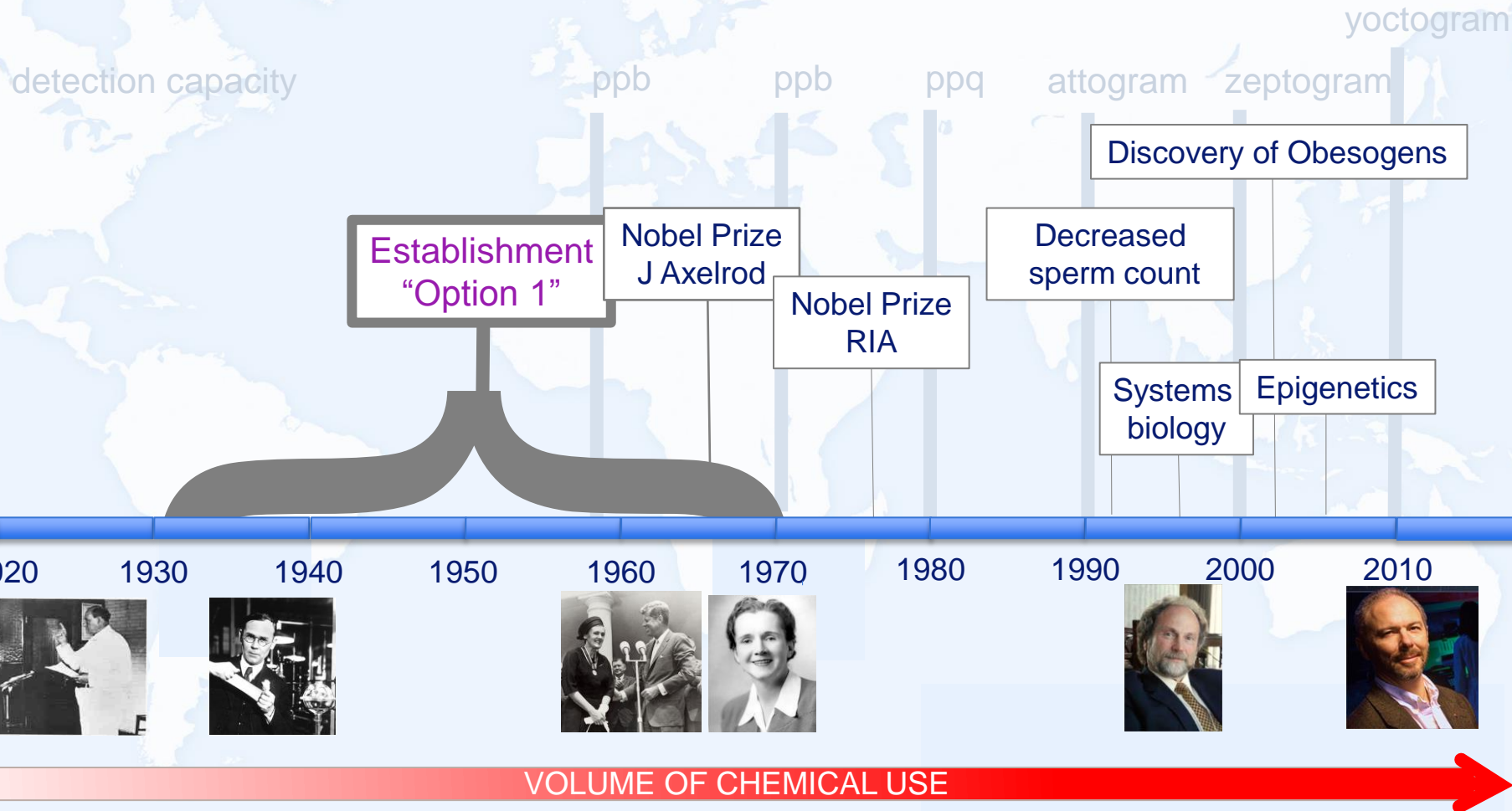


# Endocrine Society favors “Option 3”

OPTION ONE

← Obsolete criteria

# Criteria must derive from contemporary understanding of the endocrine system.



# Endocrine Society favors “Option 3”

OPTION ONE

OPTION TWO

← One category only, unrealistic

# Endocrine Society favors “Option 3”

OPTION ONE

OPTION TWO

OPTION THREE

← Several categories,  
most rational approach



# Endocrine Society does not agree with “Option 4”

OPTION ONE

OPTION TWO

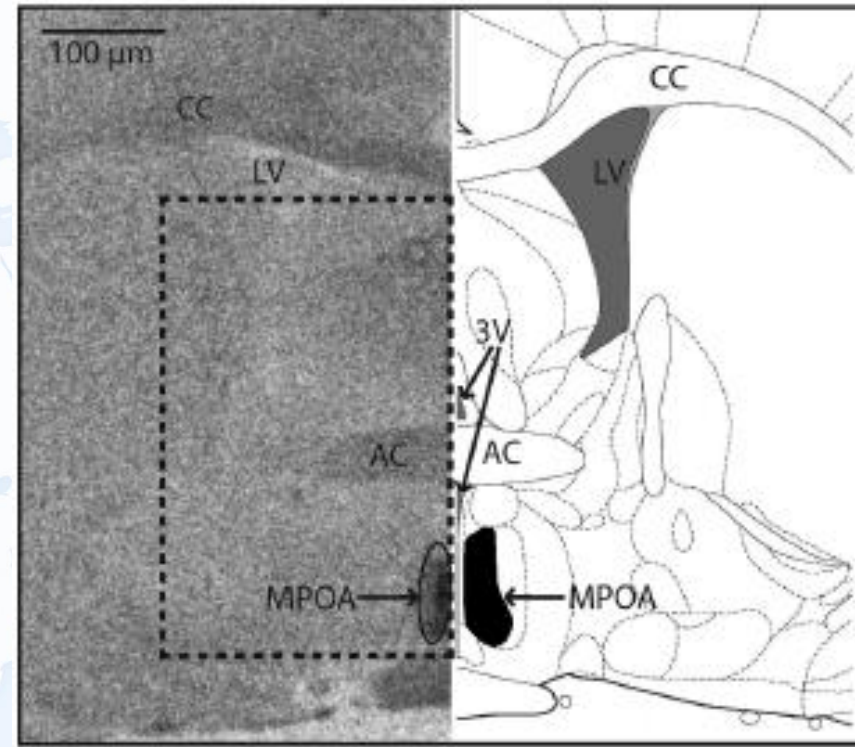
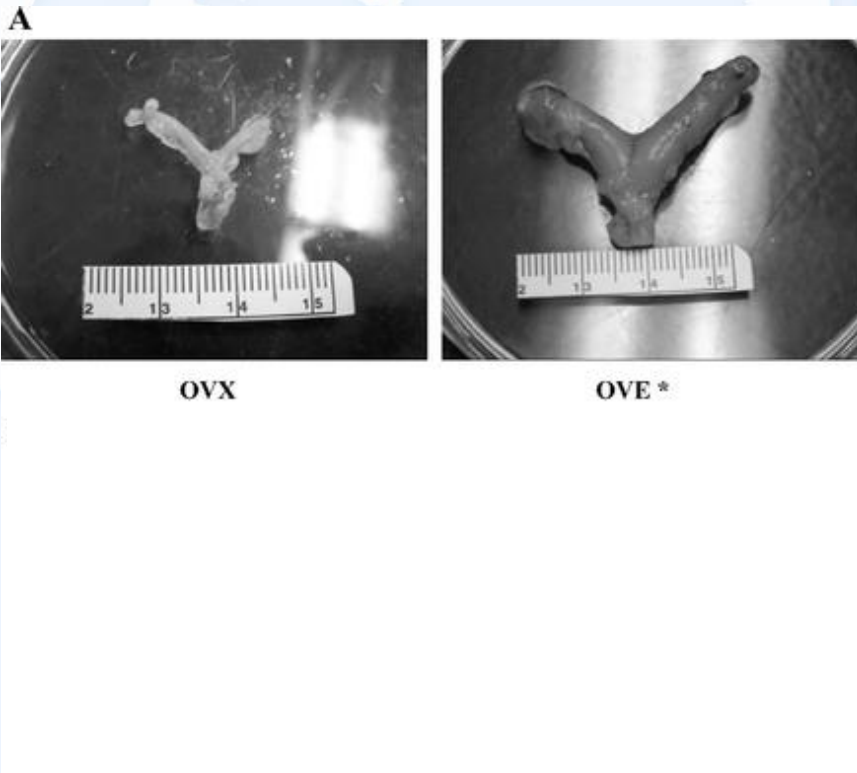
OPTION THREE

~~OPTION FOUR~~

Using potency cut off as a predominant factor would be a mistake



# Why “Potency” as a cut-off is a Mistake



Rebuli ME, Cao J, Sluzas E, Delclos KB, Camacho L, Lewis SM, Vanlandingham MM, Patisaul HB. *Toxicol Sci.* 2014;140(1):190-203.  
Delclos KB, Camacho L, Lewis SM, Vanlandingham MM, Latendresse JR, Olson GR, Davis KJ, et al. *Toxicol Sci.* 2014.



# Endocrine Society favors “Option 3”

OPTION ONE

OPTION TWO

OPTION THREE

OPTION FOUR

Using potency cut off as a predominant factor would be a mistake



# This is serious

- Current approach does not capture all EDCs
- Endocrine Perspective is critical
  - Specific endpoints
  - Low dose
  - No threshold
  - Adversity = risk factors
  - Use of the open literature
  - Estimated costs of endocrine-disrupting chemical exposure exceed €150 Billion annually in EU