

TRANSFORMING AGRICULTURE IN AFRICA
AGROECOLOGY and ORGANIC TRADE



Reducing Synthetic Pesticides and Fertilizers

Ubuntu ungamntu ngabanye abantu

Bantu proverb

"People are people through other people".





LABORATORY FOR INTEGRATIVE STUDIES IN AMPHIBIAN BIOLOGY





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Funded by:

The National Science Foundation, Novartis, Syngenta Crop Protection, Ecorisk, the World Wildlife Fund, the Alton Jones Foundation, the Homeland Foundation, the Rose Foundation, Park-Water Company, the Biofaculty Award [UCB], Distinguished Mentor Award (UCB), Ceres Trust, Distinguished Teaching Award (UCB), the Mitchell Kapor Foundation, the David Foundation, the Cornell-Douglas Foundation, the Wallace Global Fund, the Class of '43 Endowed Chair (UCB), the Toxic Substances Research and Teaching Program (UCB), Hewlett Packard, the Biology Fellows Program (Howard Hughes Medical Institute), the McNair Scholars Program (UCB), the Amgen Scholars Program (UCB), and the Mentored Research fellowship program (UCB), Marisla Foundation, Beyond Pesticides



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PESTICIDES

PESTICIDES
(TO KILL)

BIOCIDES



INSECTICIDES



FUNGICIDES



HERBICIDES







DANGER PELIGRO
PESTICIDES PESTICIDAS



KEEP OUT
NO ENTRE





**CANCER
INFERTILITY
HORMONE PROBLEMS**









Roundup
READY-TO-USE

POISON IVY PLUS TOUGH BRUSH KILLER

• KILLS POISON IVY, POISON OAK, POISON SUMAC, WILD BLACKBERRY, VIBURNUM

Easy To Use! Just Spray! Kills Tough Brush In 3 Hours! CAUTION: Irritant. Avoid Contact With Skin. PRECAUTION: Avoid Contact With Skin.

NET 2.5 GALLONS (1 GAL, 4 FL. OZ.)

FastAct[®]
TECHNOLOGY

Roundup
READY-TO-USE

WEED & GRASS KILLER III

• RAINPROOF IN 10 MINUTES
• VISIBLE RESULTS IN 3 HOURS

Easy To Use! Just Spray! Kills Tough Brush In 3 Hours! CAUTION: Irritant. Avoid Contact With Skin. PRECAUTION: Avoid Contact With Skin.

NET 1.25 GALLONS (1 GAL, 4 FL. OZ.)

COMFORT WAND™

CONTAINS GREAT EXTENDED WEED KILLER

Roundup
EXTENDED CONTROL

GRASS KILLER AND PREVENTER

• KILLS IN 30 MINUTES
• PREVENTS GROWTH IN 3 HOURS

Easy To Use! Just Spray! Kills Tough Brush In 3 Hours! CAUTION: Irritant. Avoid Contact With Skin. PRECAUTION: Avoid Contact With Skin.

NET 1.25 GALLONS (1 GAL, 4 FL. OZ.)

COMFORT WAND™

Roundup
READY-TO-USE CONCENTRATE PLUS

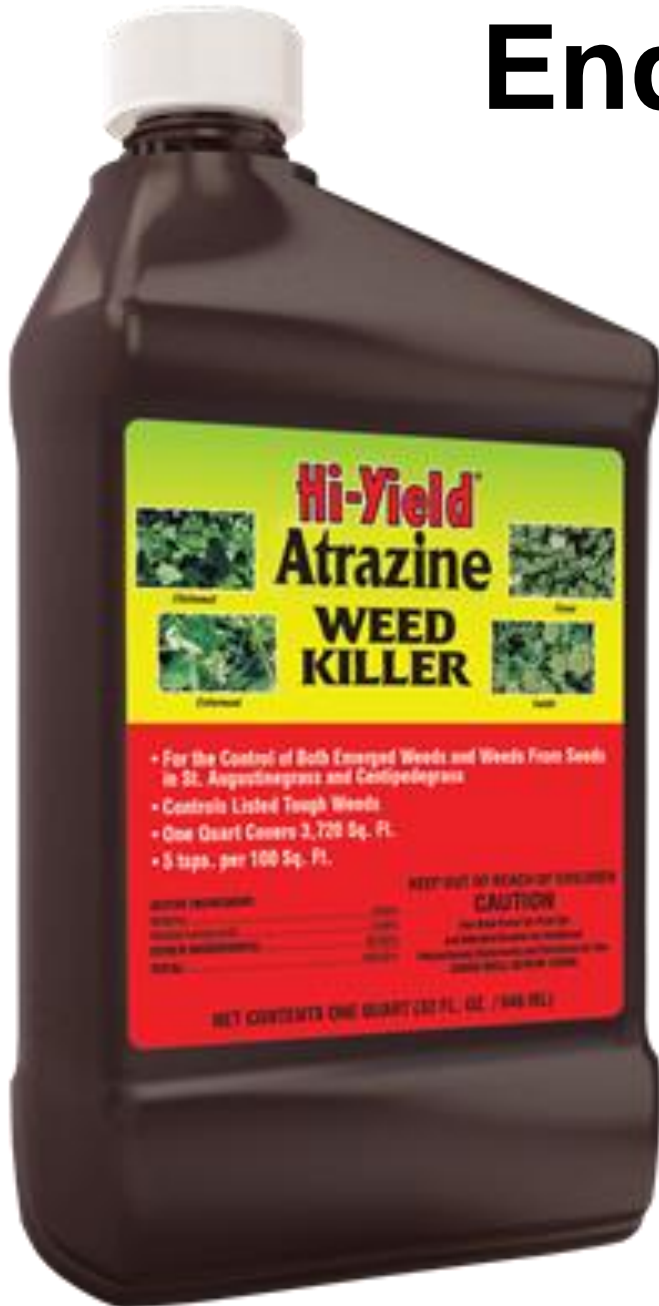
• KILLS WEEDS & GRASS

Easy To Use! Just Spray! Kills Tough Brush In 3 Hours! CAUTION: Irritant. Avoid Contact With Skin. PRECAUTION: Avoid Contact With Skin.

NET 1.25 GALLONS (1 GAL, 4 FL. OZ.)



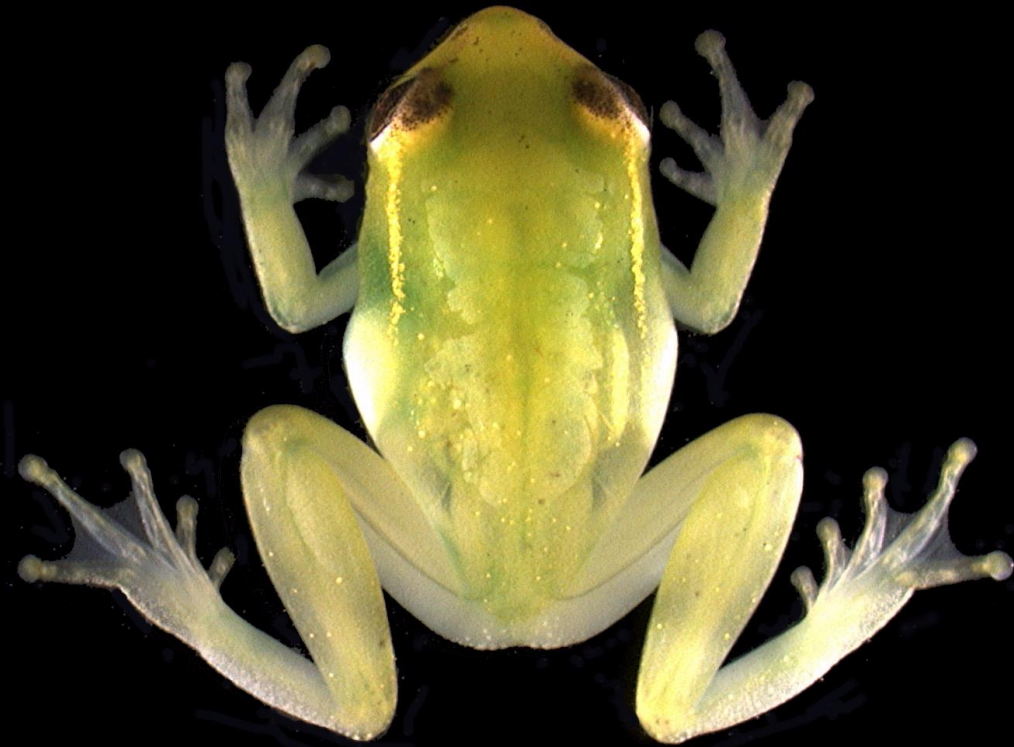
Endocrine Disruptors:



Chemicals that mimic hormones or interfere with hormone synthesis, transport, action, or degradation







Male

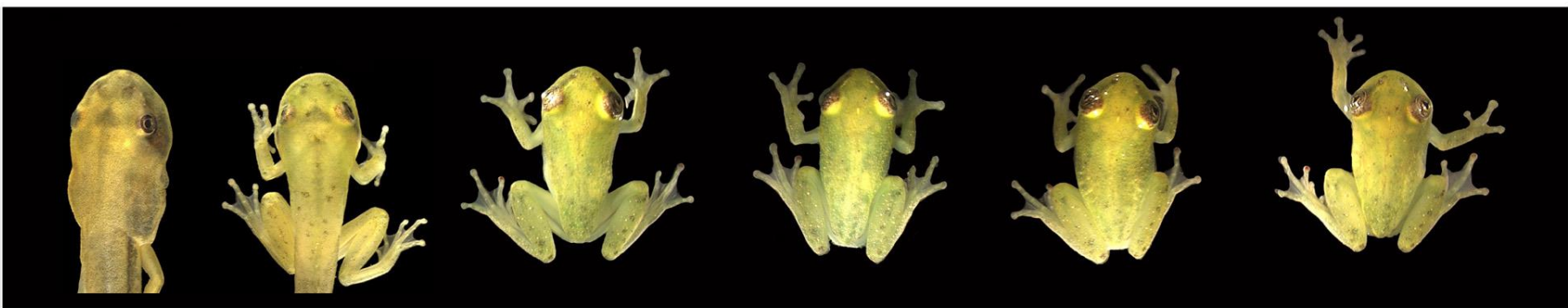


Female

Control



Testosterone



Estradiol



1

2

3

4

5

6



Control



Estradiol



Ethynyl-E2



DES



DDT

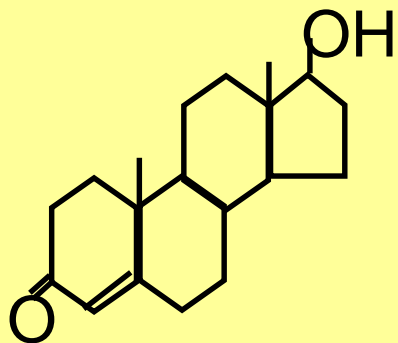


**Estrogen +
Tamoxifen**

ATRAZINE

80 MILLION POUNDS
HAS BEEN USED
IS USED IN
MORE THAN
80 COUNTRIES

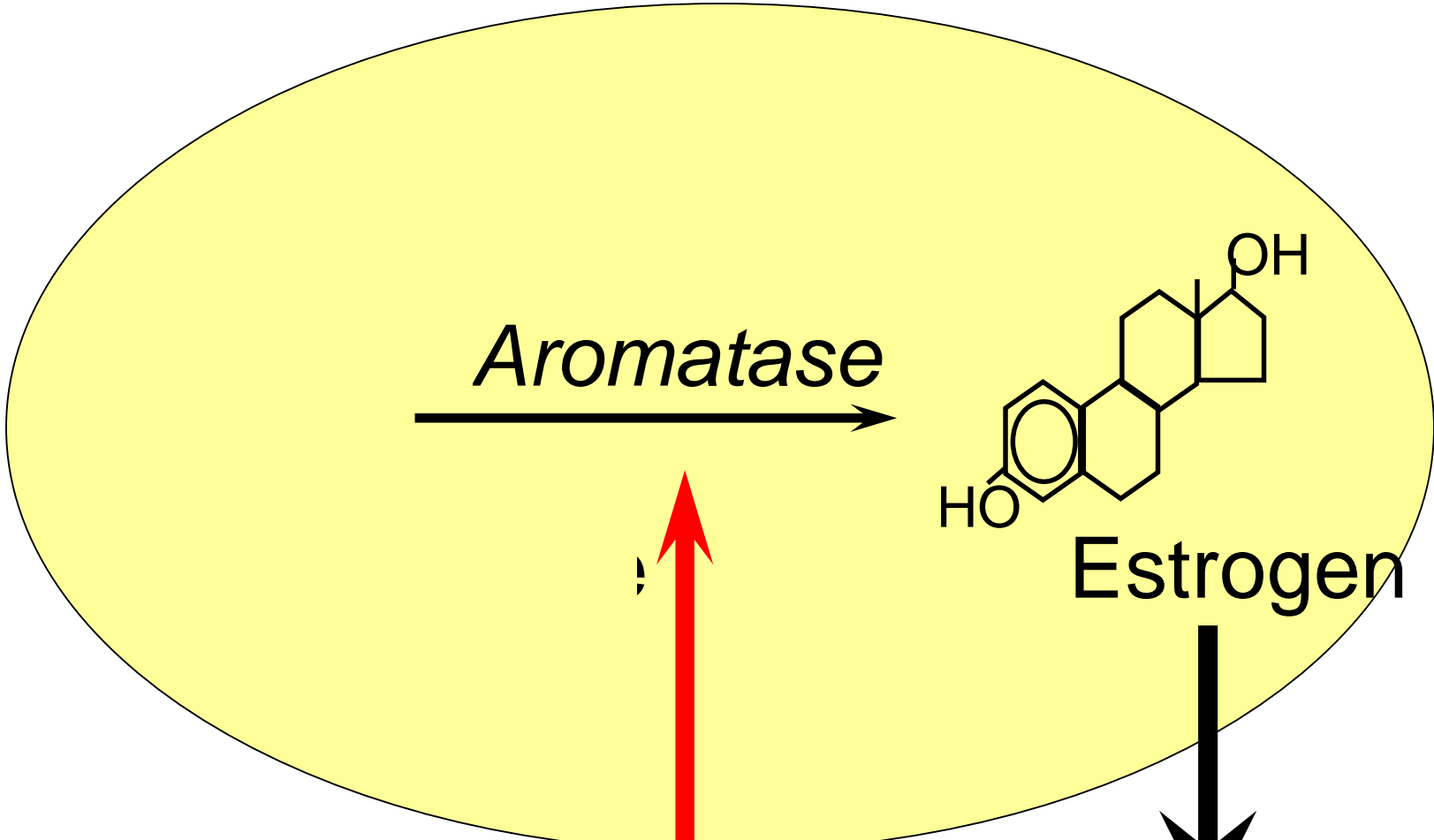




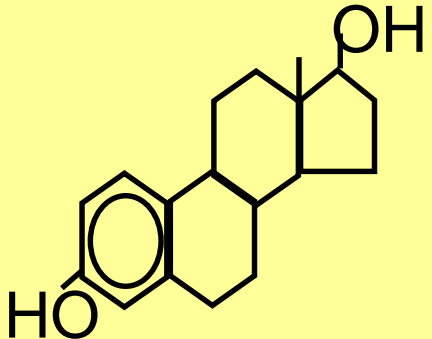
Testosterone



T



Aromatase

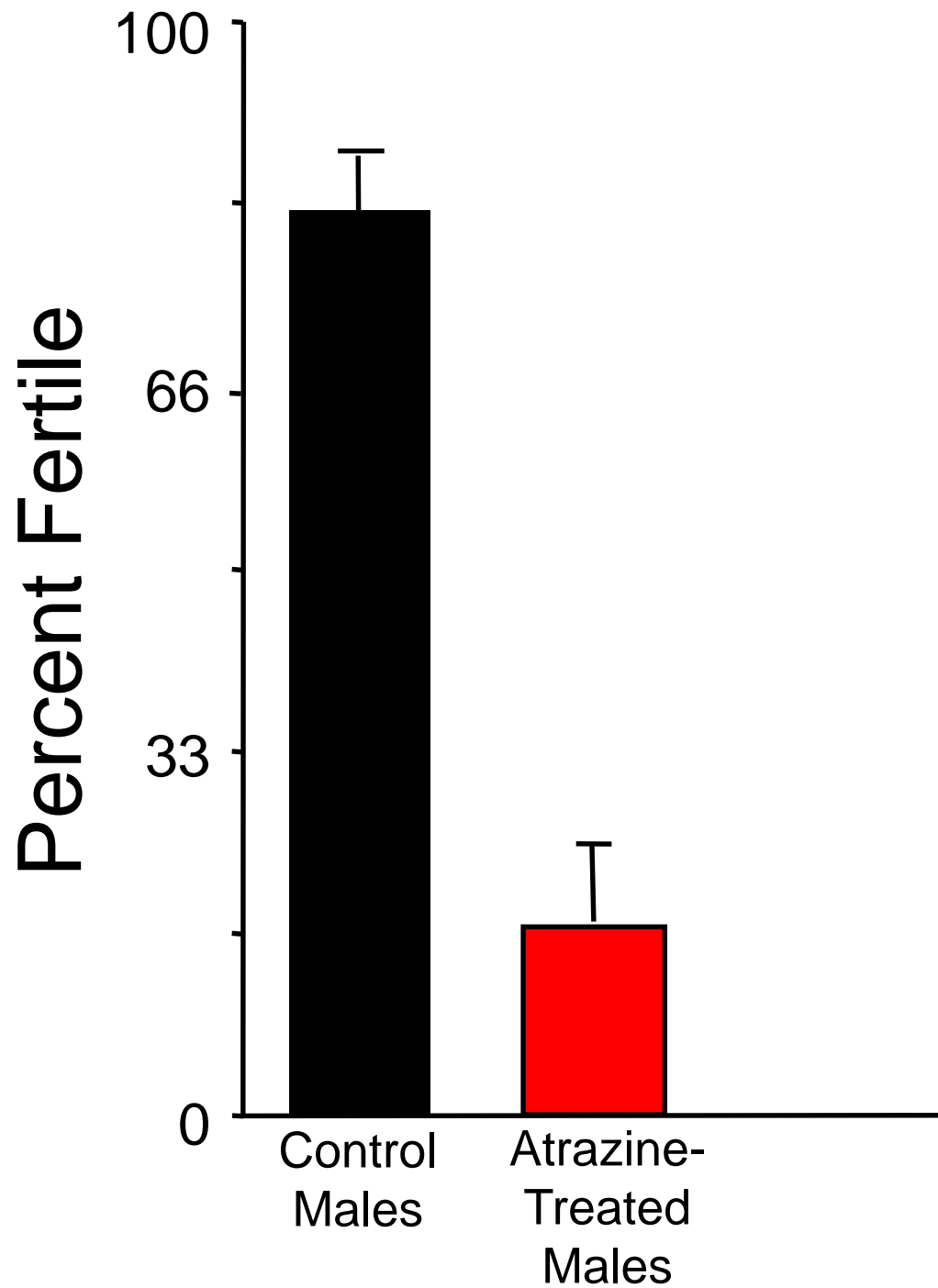


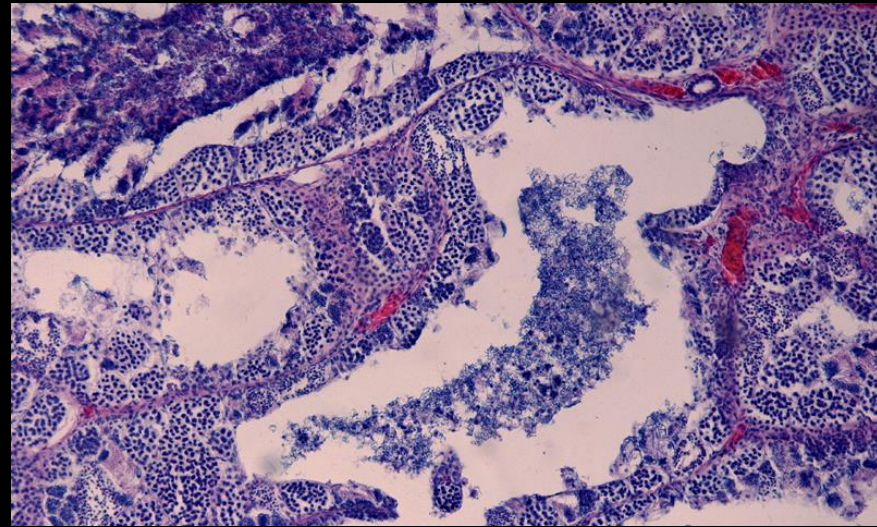
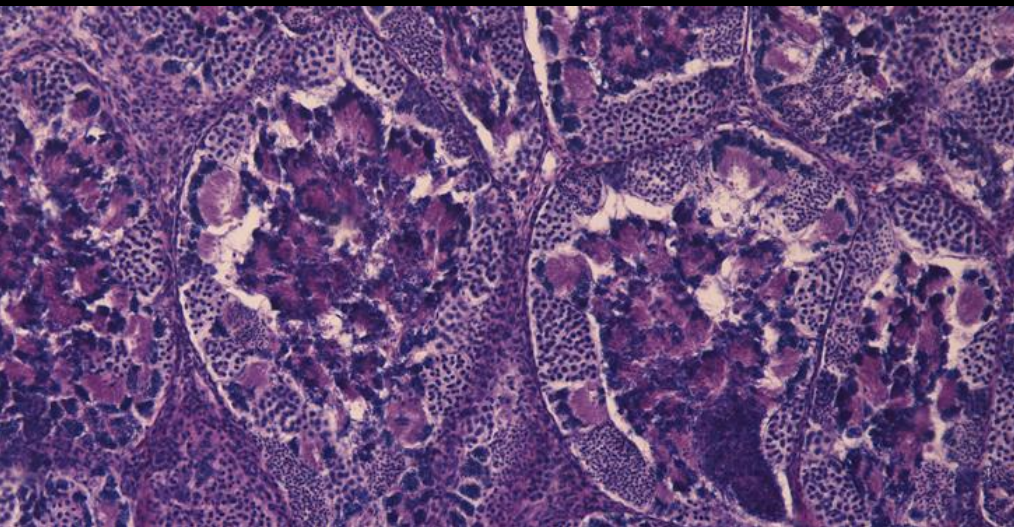
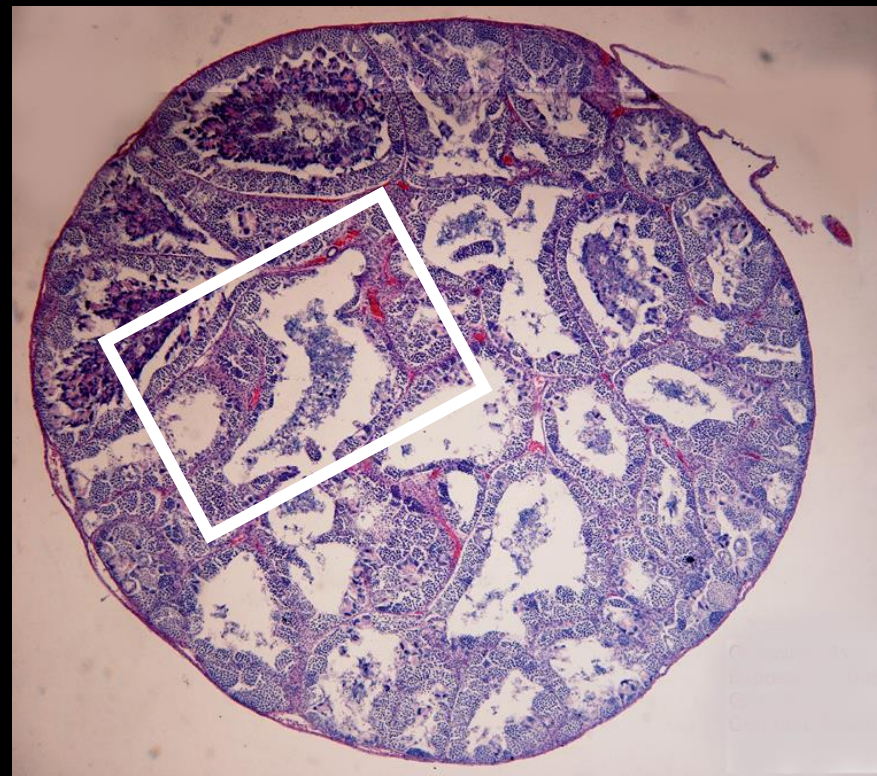
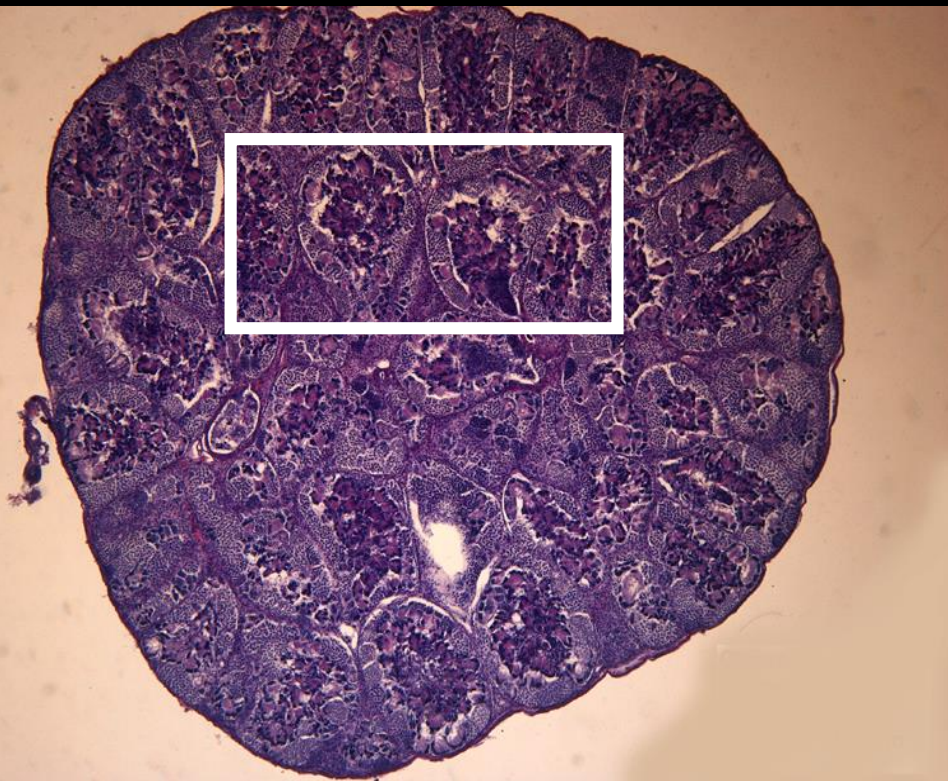
Estrogen

ATRAZINE

E

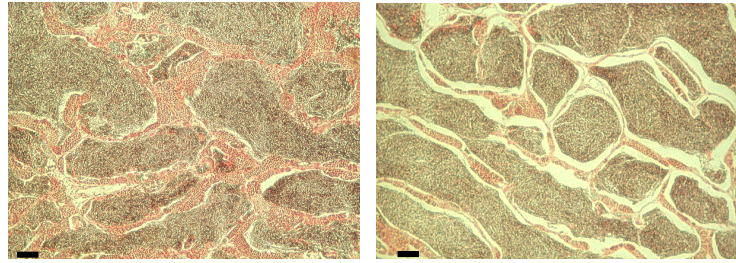
ATRAZINE
EMASCULATES
MALES



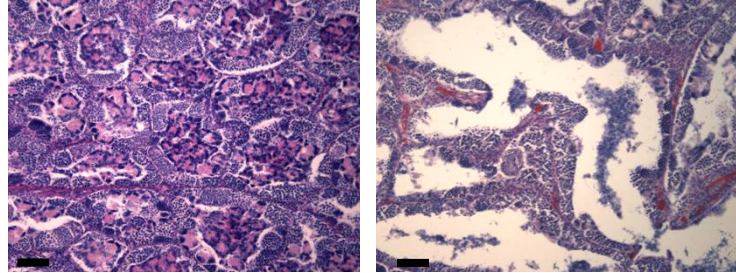


Control Atrazine

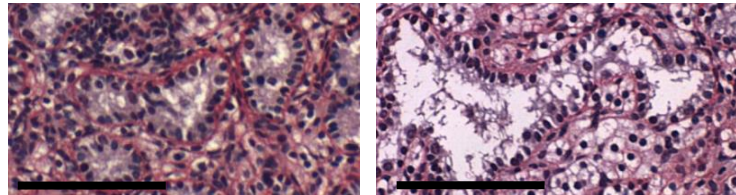
Fish
(Kestemont *et al.*)



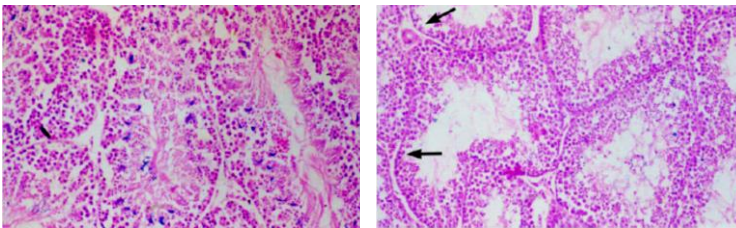
Amphibians
(Hayes *et al.*)



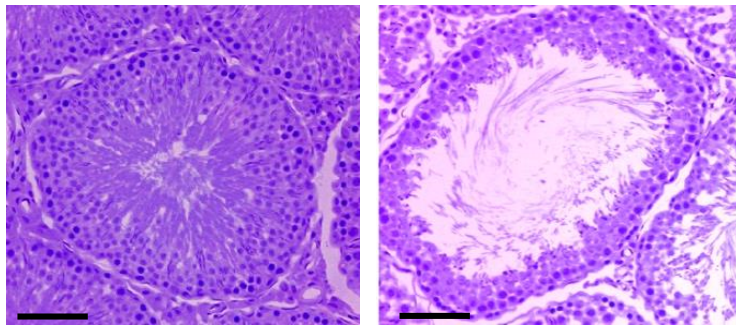
Reptiles
(Muñoz-de-Toro *et al.*)



Birds
(Hussain *et al.*)

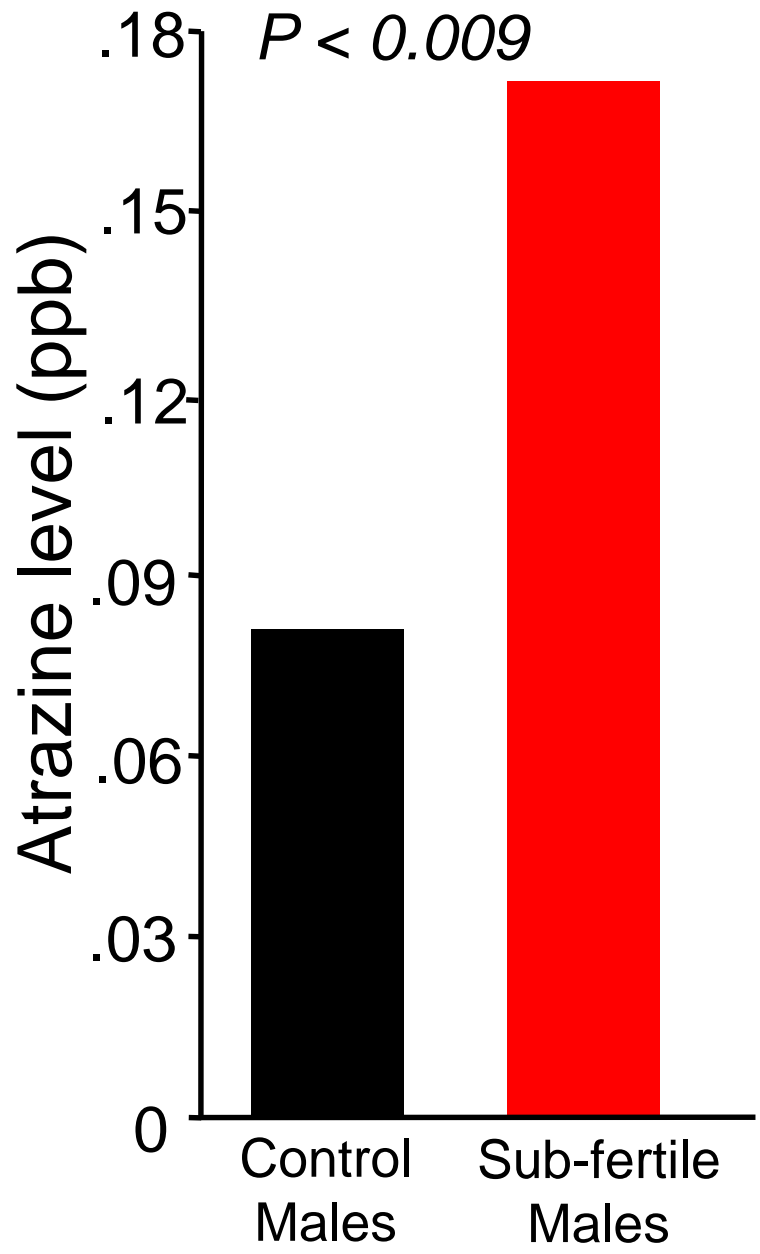


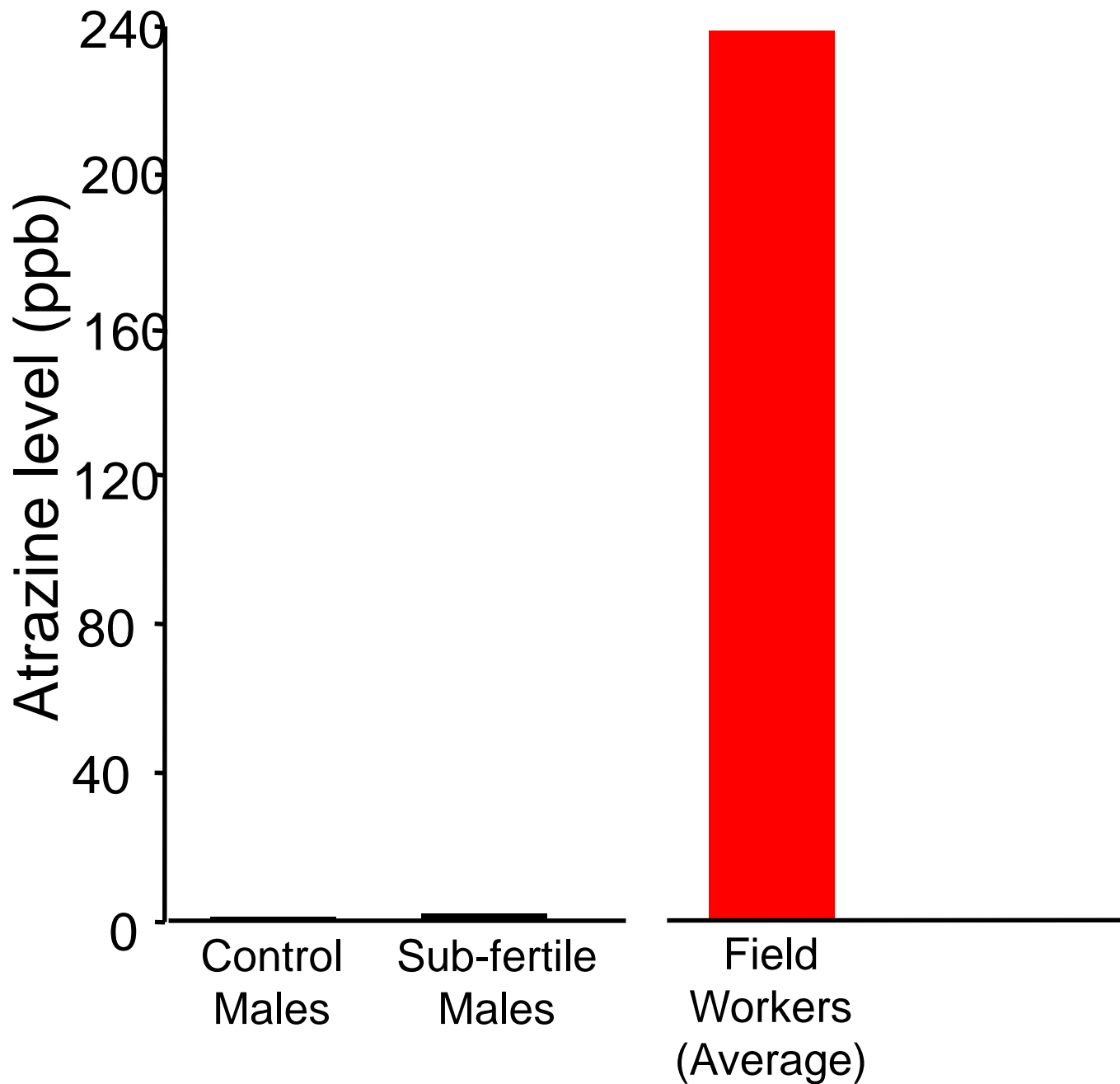
Mammals
(Victor-Costa *et al.*;
Kniewald *et al.*)

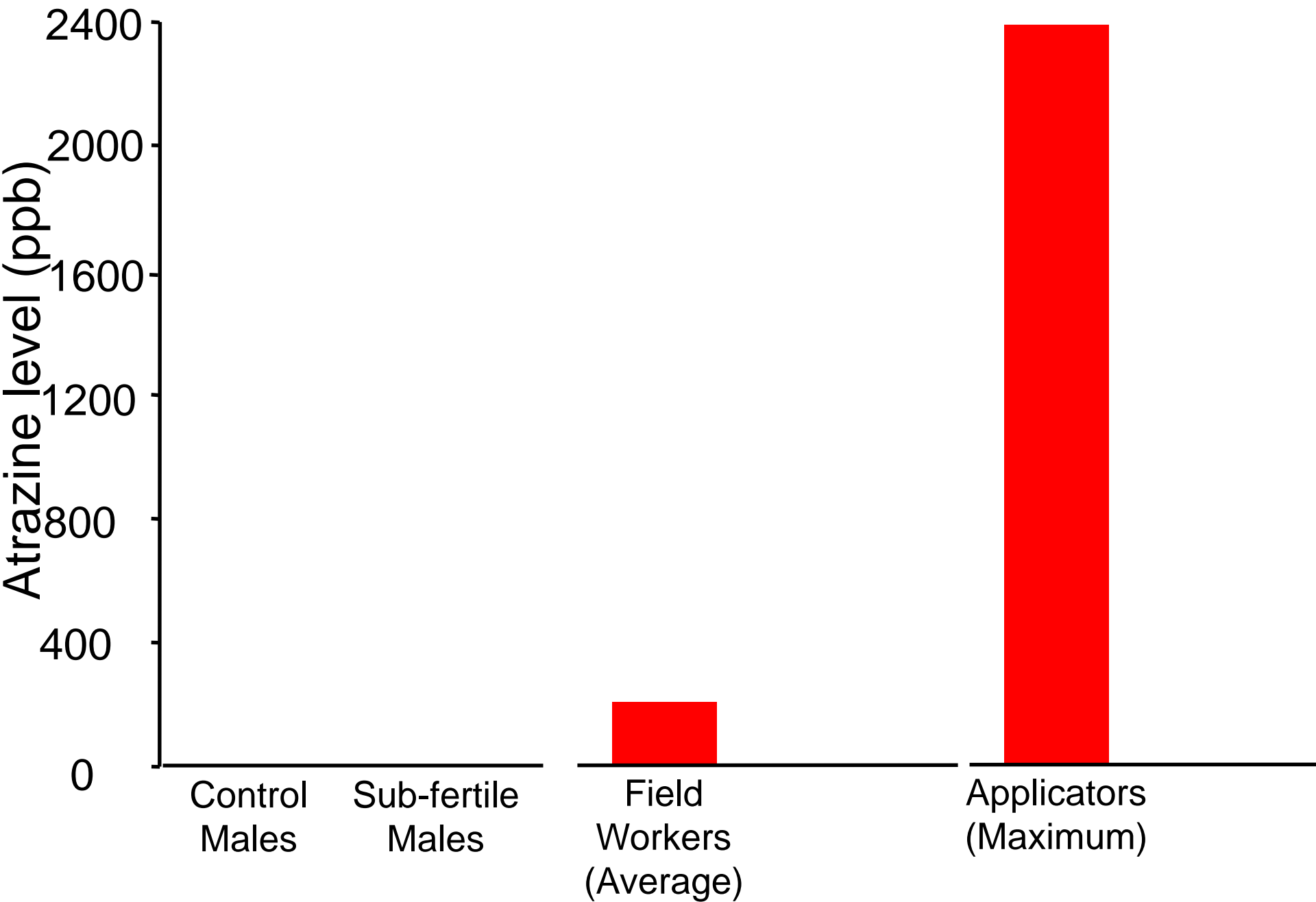


In humans
Swan *et al.*, 2003

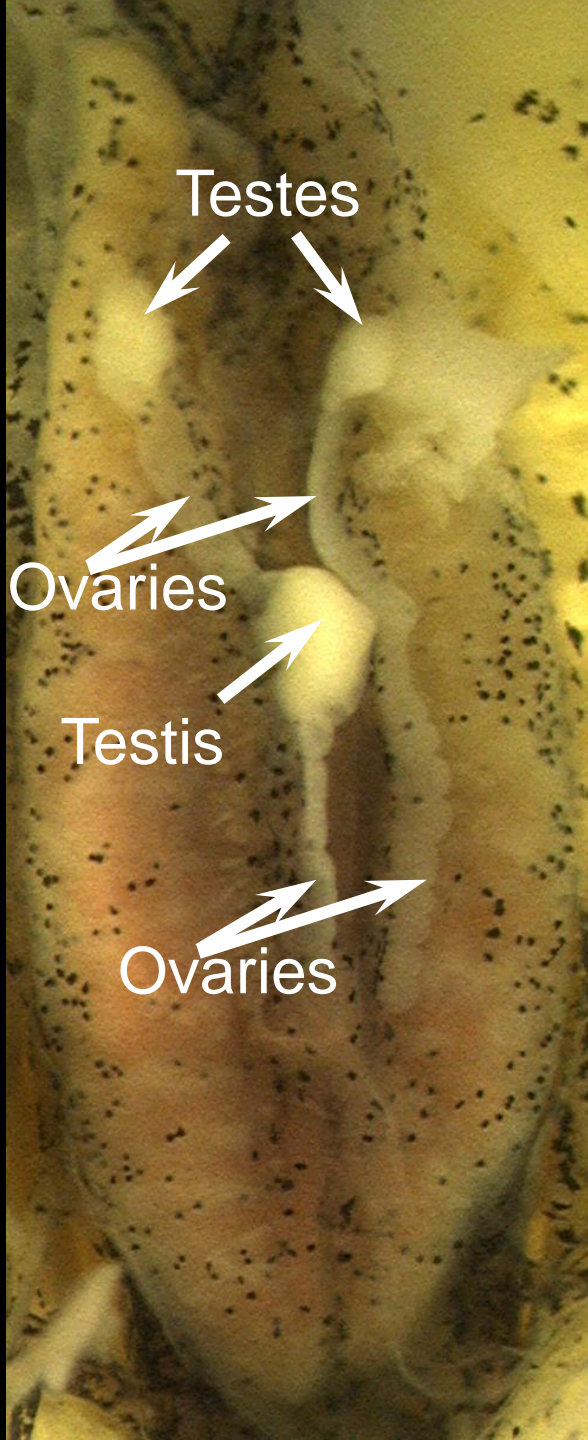
$P < 0.009$







**ATRAZINE
FEMINIZES
MALES**



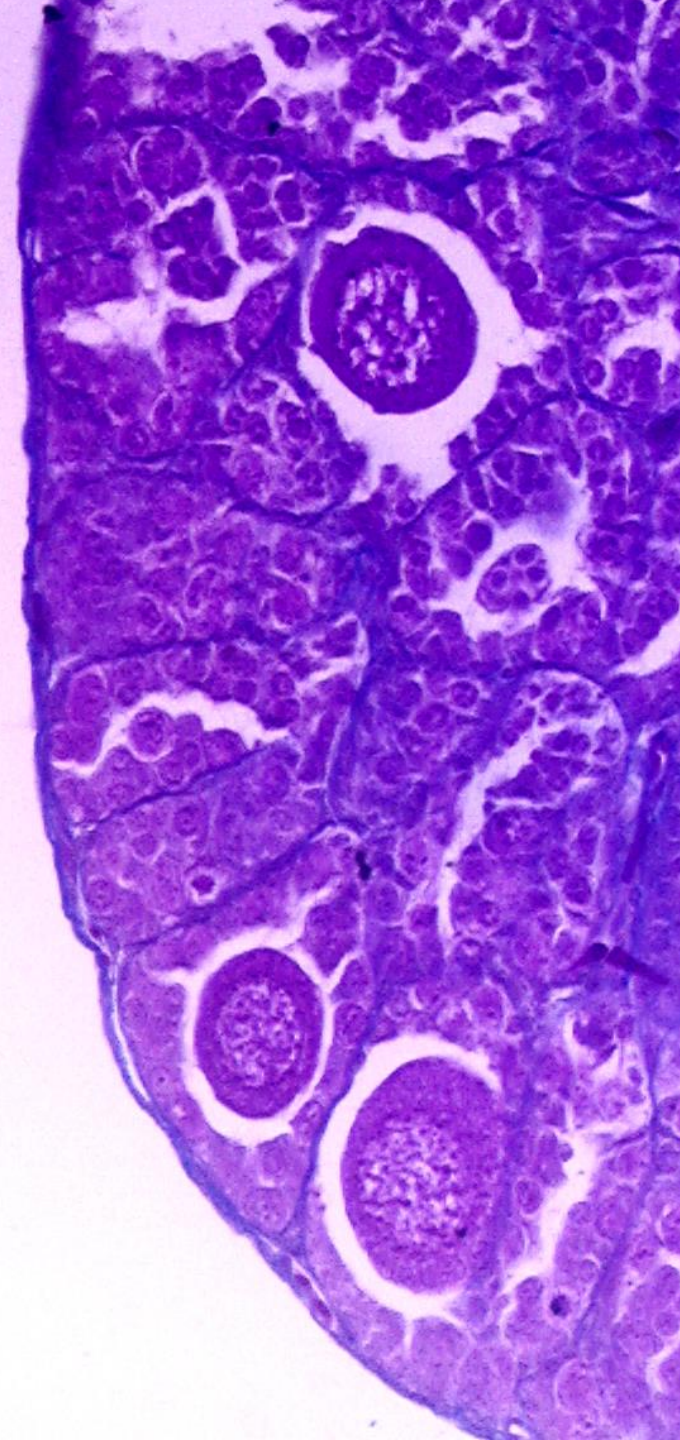
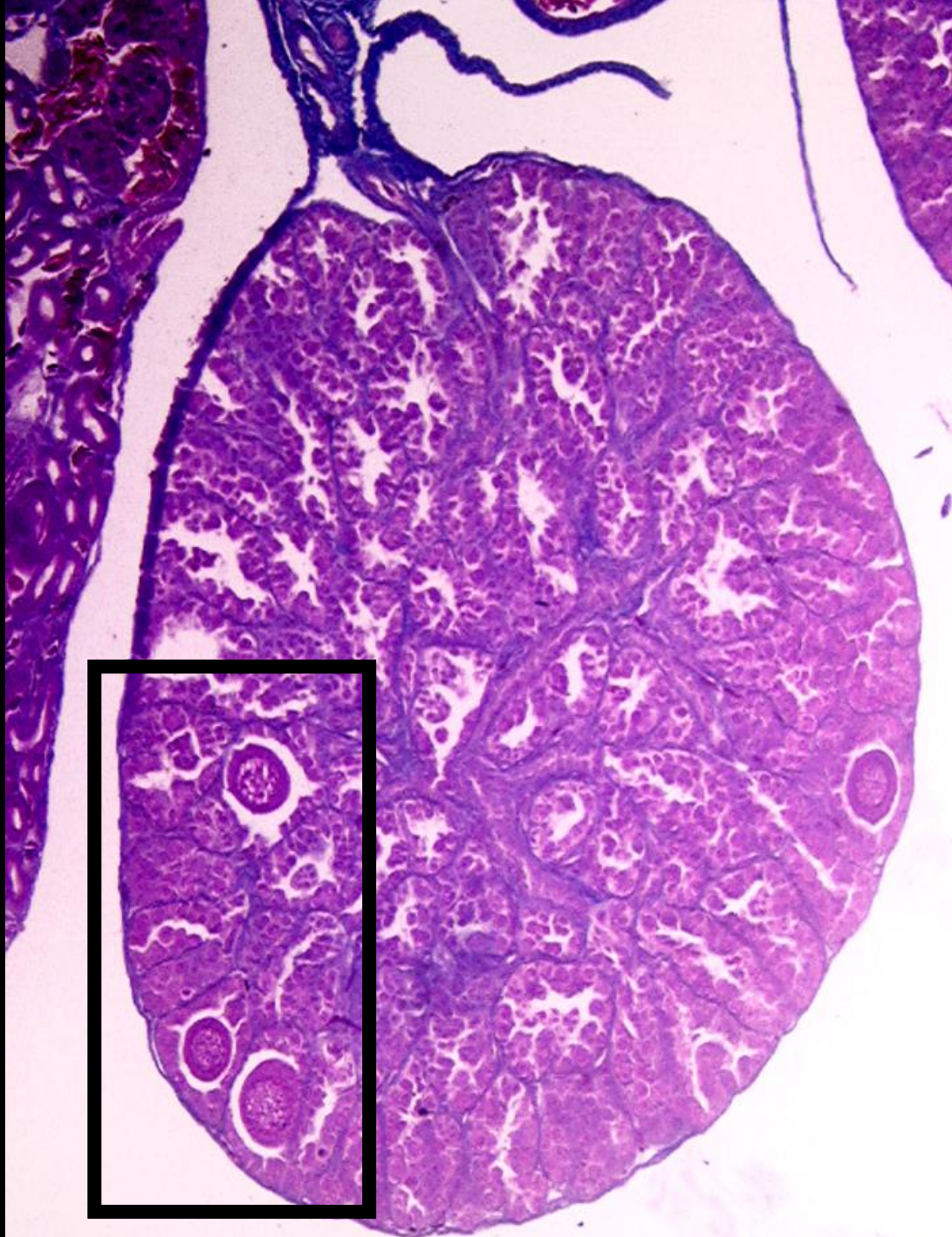
Testes

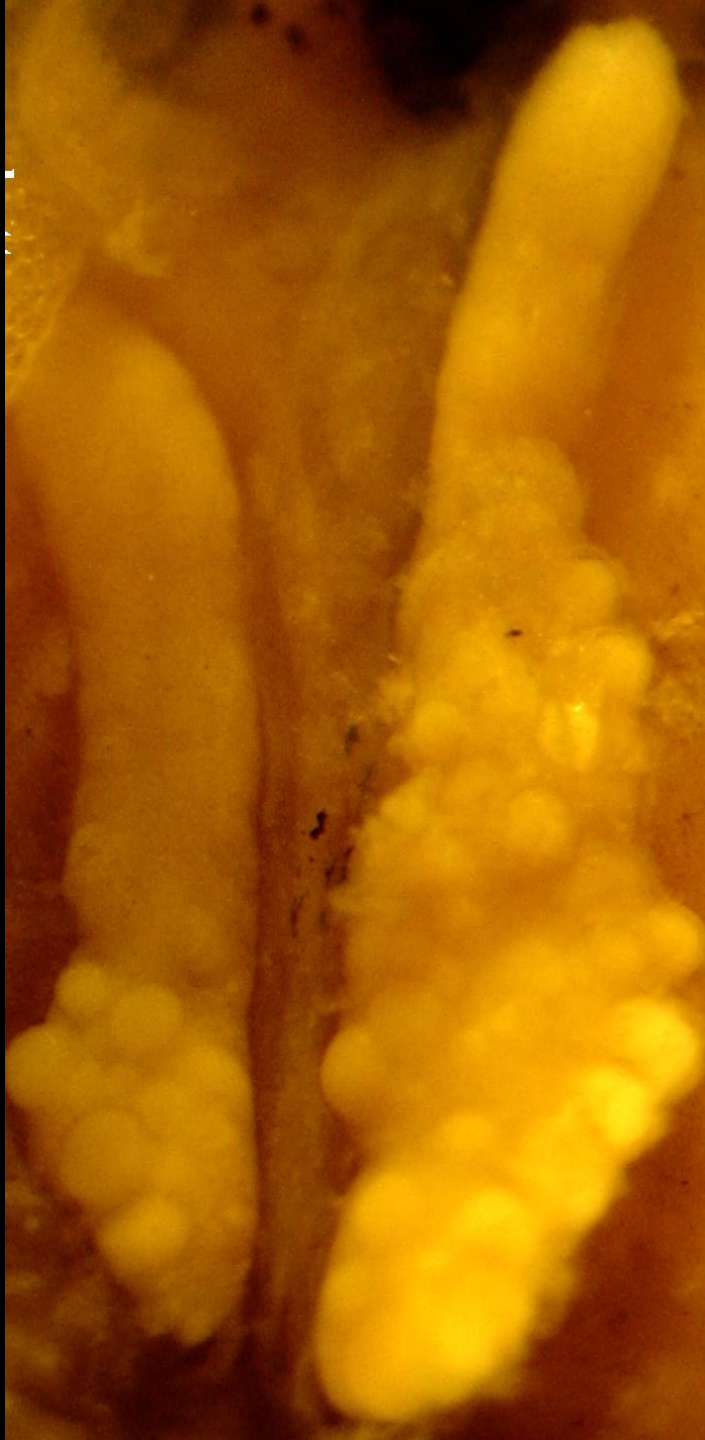
Ovaries

Testis

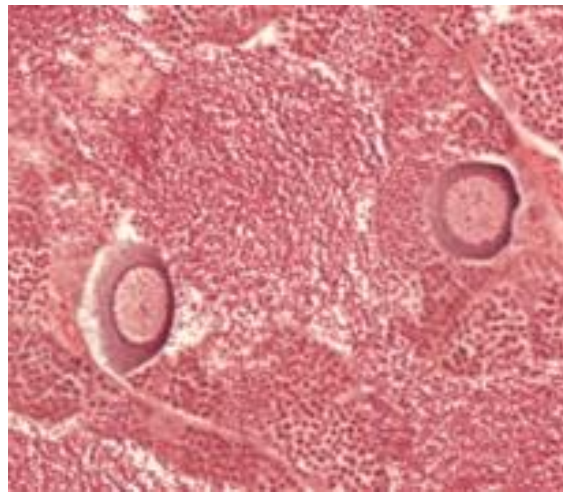
Ovaries







Fish
(Tillit *et al.*)

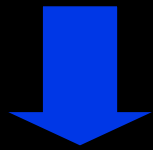
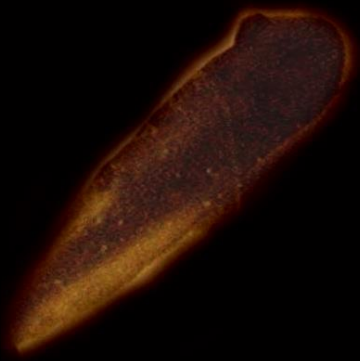
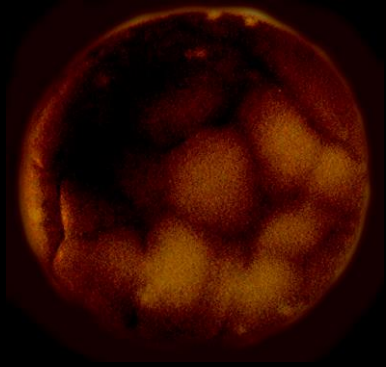


Amphibians
(Hayes *et al.*)



Reptiles
(de Solla *et al.*)



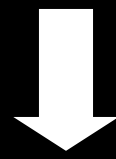
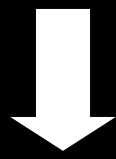




Prostate
And
Mammary
Cancer

Immune
Failure

Abortion



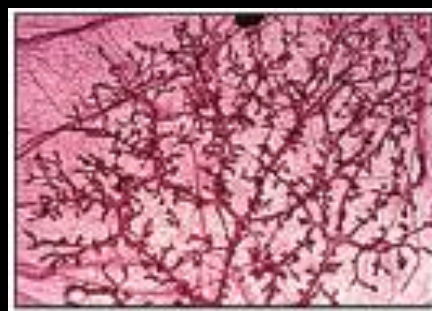
Impaired
Mammary
Development



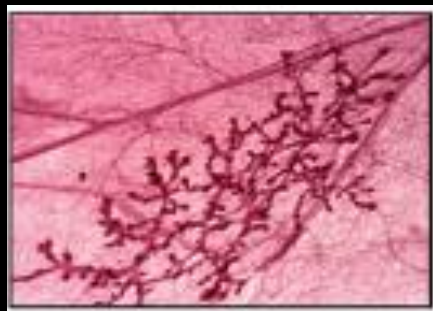
Prostate
Disease



Neural
Damage



Control



Atrazine



Prostate
And
Mammary
Cancer



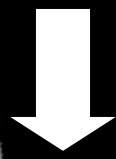
Immune
Failure



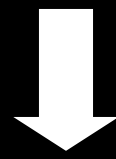
Abortion



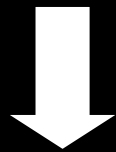
Impaired
Mammary
Development



Prostate
Disease



Neural
Damage



Impaired
Growth and Development



Abortion



Impaired
Mammary
Development



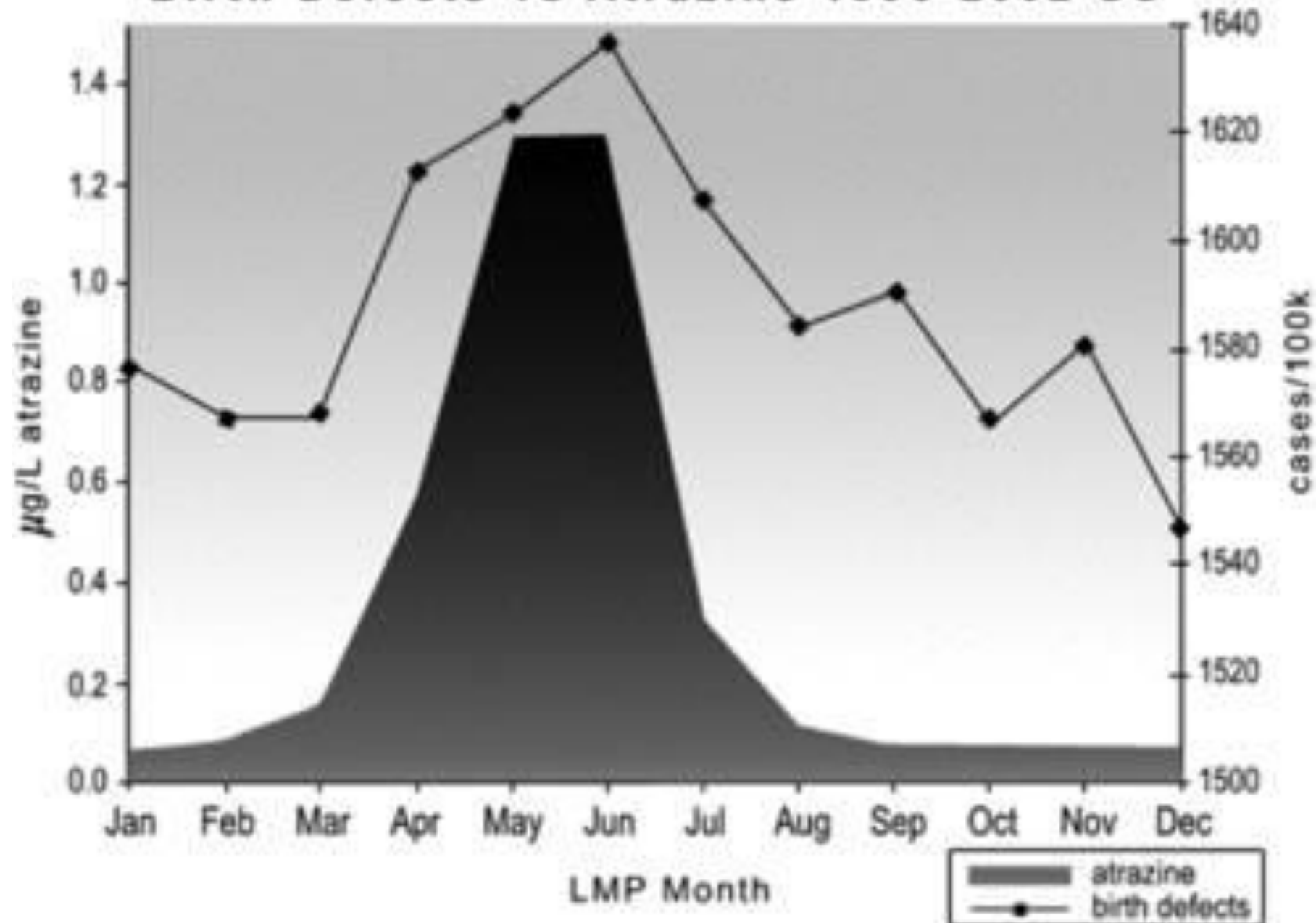
Prostate
Disease



Impaired
Growth and Development



Birth Defects vs Atrazine 1996-2002 US



Agricultural-related chemical exposures, season of conception, and risk of gastroschisis in Washington State

Sarah A. Waller, MD; Kathleen Paul, MPH; Suzanne E. Peterson, MD; Jane E. Hitti, MD, MPH



OBJECTIVE: We sought to determine if periconceptional exposure to agrichemicals was associated with the development of gastroschisis.

STUDY DESIGN: We conducted a retrospective, case-controlled study using Washington State Birth Certificate and US Geological Survey databases. Cases included all live-born singleton infants with gastroschisis. Distance between a woman's residence and site of elevated exposure to agrichemicals was calculated. Multivariate regression was used to estimate the association between surface water concentrations of agrichemicals and the risk of gastroschisis.

RESULTS: Eight hundred five cases and 3616 control subjects were identified. Gastroschisis occurred more frequently among those who resided <25 km from a site of high atrazine concentration (odds ratio, 1.6). Risk was related inversely to the distance between the maternal residence and the closest toxic atrazine site. In multivariate analysis, nulliparity, tobacco use, and spring conception remained significant predictive factors for gastroschisis.

CONCLUSION: Maternal exposure to surface water atrazine is associated with fetal gastroschisis, particularly in spring conceptions.

Key words: abdominal wall defect, atrazine, gastroschisis, herbicide

CONCLUSION: Maternal exposure to surface water atrazine is associated with fetal gastroschisis, particularly in spring conceptions.

This is gastroschisis...



Maternal Residential Atrazine Exposure and Risk for Choanal Atresia and Stenosis in Offspring

A. Jack Agopian, PhD¹, Yi Cai, MS¹, Peter H. Langlois, PhD², Mark A. Canfield, PhD², and Philip J. Lupo, PhD^{1,3}

Objective To assess the relationship between estimated residential maternal exposure to atrazine during pregnancy and the risk for choanal atresia or stenosis in offspring.

Study design Data for 280 nonsyndromic cases and randomly selected, population-based controls delivered between 1999 and 2008 were obtained from the Texas Birth Defects Registry. County-level estimates of atrazine levels obtained from the US Geological Survey were assigned to cases and controls based on maternal county of residence at delivery. Unconditional logistic regression was used to assess the relationship between maternal residential atrazine exposure and the risk for choanal atresia or stenosis in offspring.

Results Compared with offspring of mothers with low levels of estimated residential atrazine exposure, those with high levels had nearly a 2-fold increase in risk for choanal atresia or stenosis (aOR, 1.79; 95% CI, 1.17-2.74). A significant linear trend was also observed with increasing levels of atrazine exposure (adjusted $P = .002$).

Conclusion A link between maternal exposure to endocrine disruptors, such as atrazine, and the risk of choanal atresia is plausible based on previous findings. Our results lend further support to this hypothesis. (*J Pediatr* 2013;162:581-6).

This is choanal atresia...



Case–Control Study of Maternal Residential Atrazine Exposure and Male Genital Malformations

A.J. Agopian,¹ Philip J. Lupo,^{2*} Mark A. Canfield,³ and Peter H. Langlois³

¹Human Genetics Center, Division of Epidemiology, Human Genetics and Environmental Sciences, University of Texas School of Public Health, Houston, Texas

²Department of Pediatrics, Hematology–Oncology Section, Baylor College of Medicine, Houston, Texas

³Birth Defects Epidemiology and Surveillance Branch, Texas Department of State Health Services, Austin, Texas

Manuscript Received: 31 August 2012; Manuscript Accepted: 15 November 2012

Separate unconditional logistic regression analyses were conducted for hypospadias, cryptorchidism, and small penis. We observed modest, but consistent, associations between medium-low and/or medium levels of estimated periconceptual maternal residential atrazine exposure and every male genital malformation category evaluated (e.g., adjusted odds ratio for medium compared to low atrazine levels and all male genital malformations: 1.2, 95% confidence interval: 1.1-1.3). Previous literature from animal and epidemiological studies supports our findings. Our results provide further evidence of a suspected teratogenic role of atrazine.

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²Department of Pediatrics, Hematology–Oncology Section, Baylor College of Medicine, Houston, Texas

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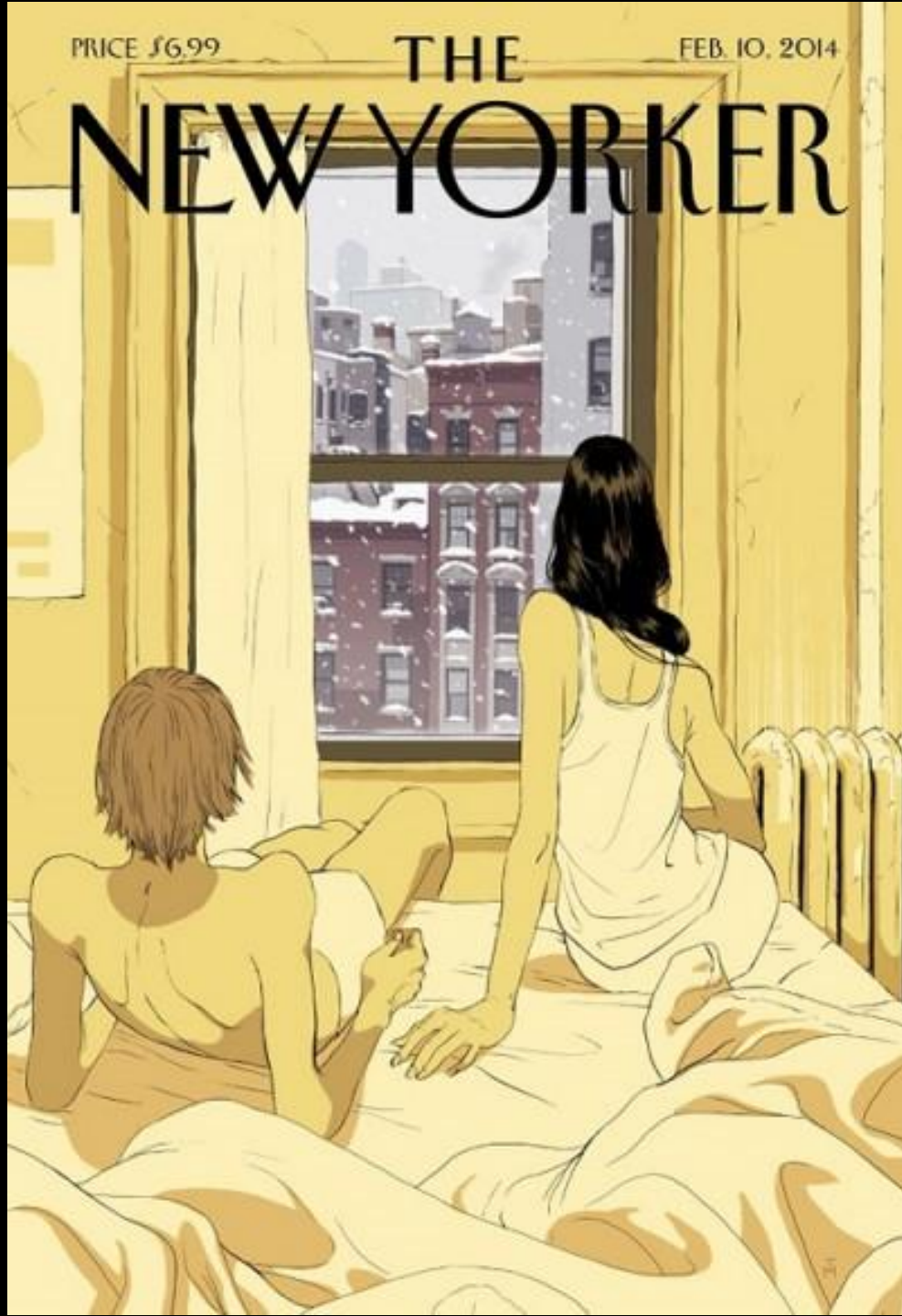
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**Government
Regulatory
Agencies?**

PRICE \$6.99

FEB. 10, 2014

THE NEW YORKER



“a monetary value is assigned to disease, impairments, and shortened lives and weighed against the benefits of keeping a chemical in use.”

**(United States,
Environmental Protection Agency)**

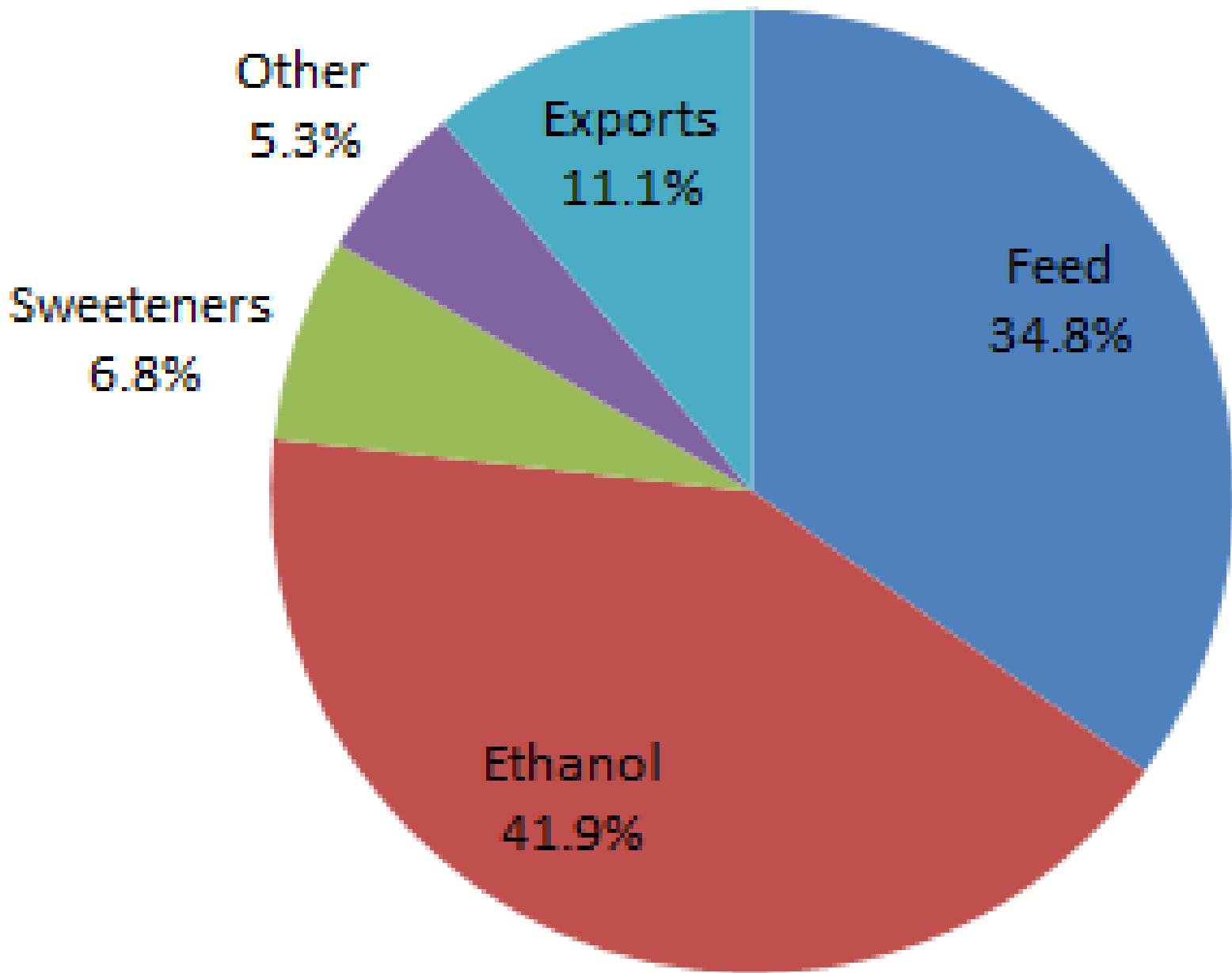








Agribusiness?



FILED UNDER SEAL

Privileged and Confidential

Education / Awareness

- legislators
- target states
- farmers
- media

science.

discredit Hayes

- complete frog studies
- outstanding epi studies
- monitoring

Politics / Legislation

state laws

Competitive Interactions

Legal

Holiday Shows



**Obama Appoints Monsanto's VP
as Senior Advisor to the FDA**

“The ultimate decision
is much bigger than science...
It weighs in public opinion.”

Stephen Bradbury
US EPA, Dec 3, 2006

Thank you

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<https://www.fertilome.com/product/atrazine-weed-killer-32-oz>