Establishing *ex vivo* brain-pituitary and gonadal models for PFAS toxicity assessment

Sina Velzi

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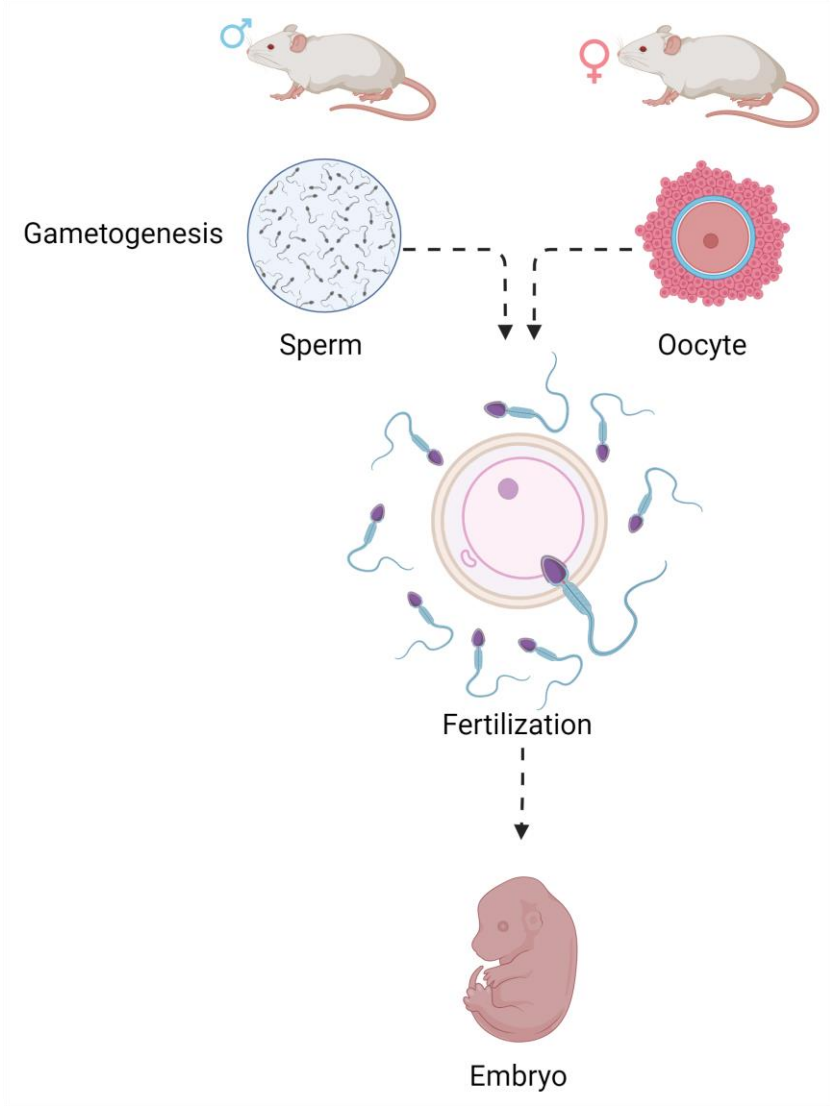
NSFT Winter Meeting 2025

Reproduction in living organisms



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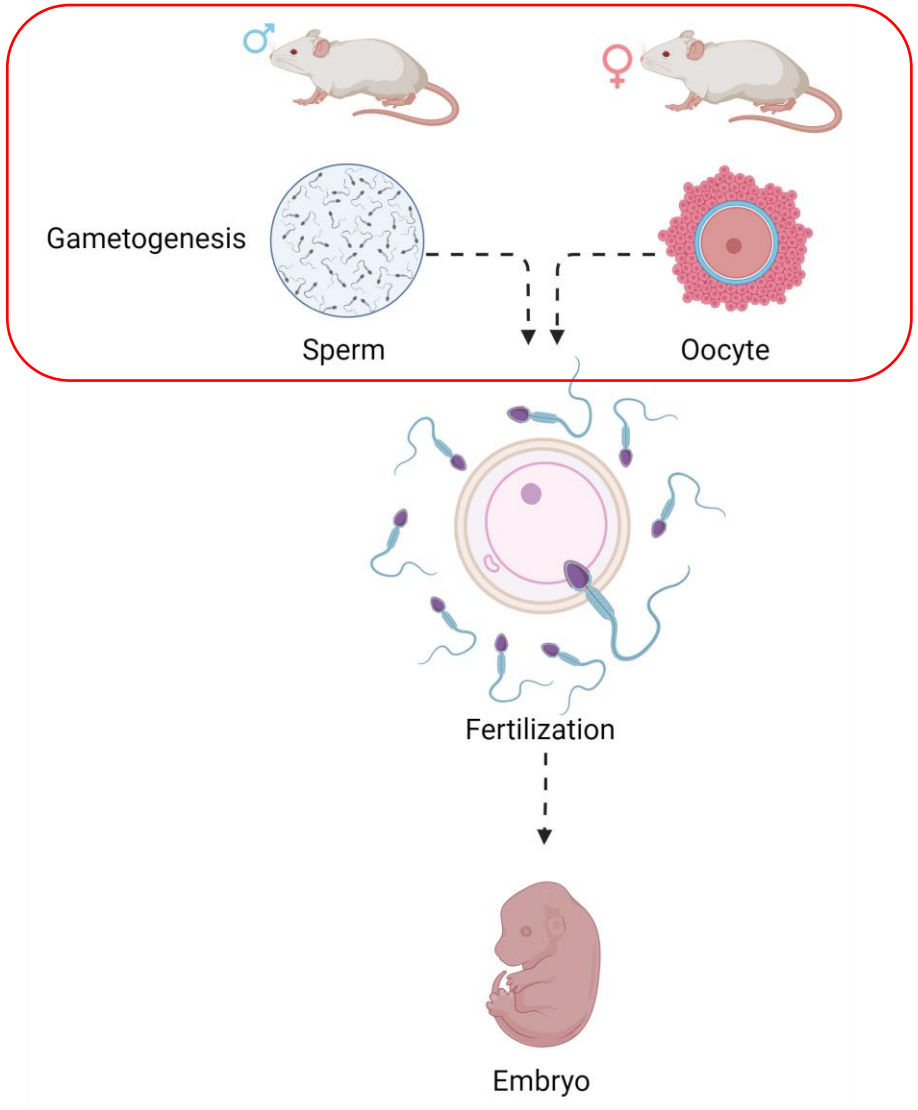

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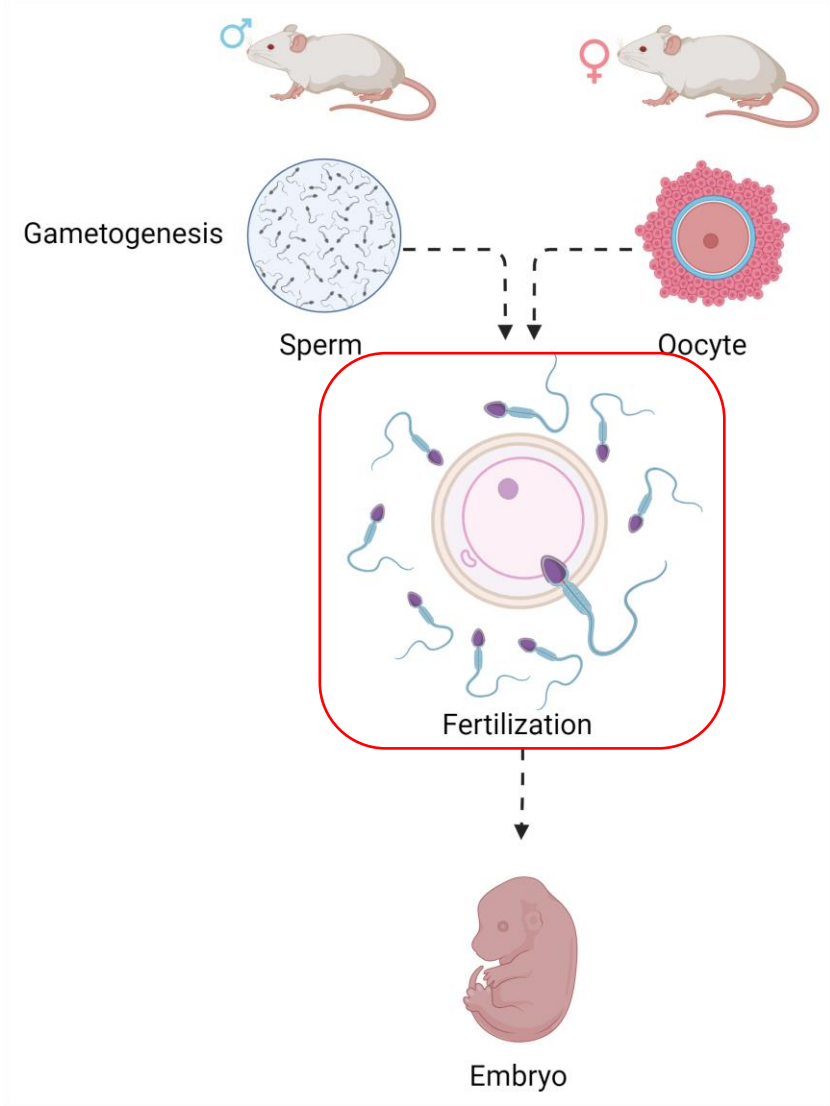

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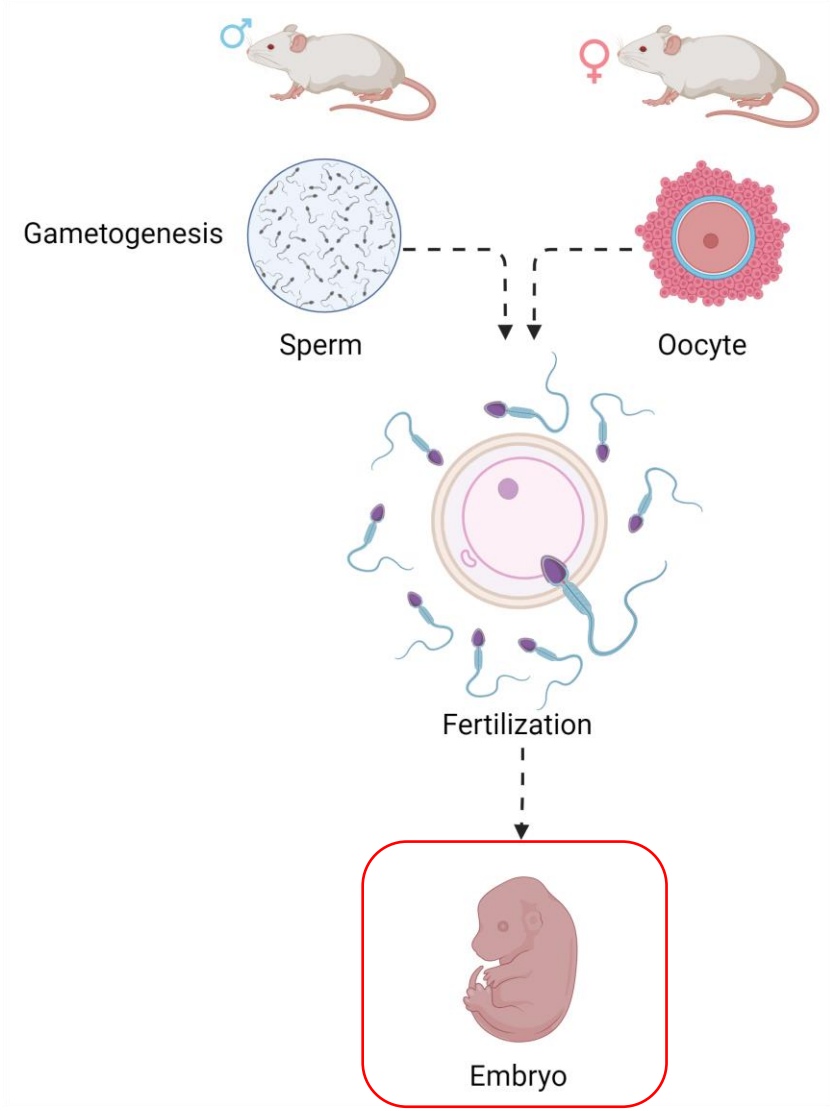
Reproduction in living organisms



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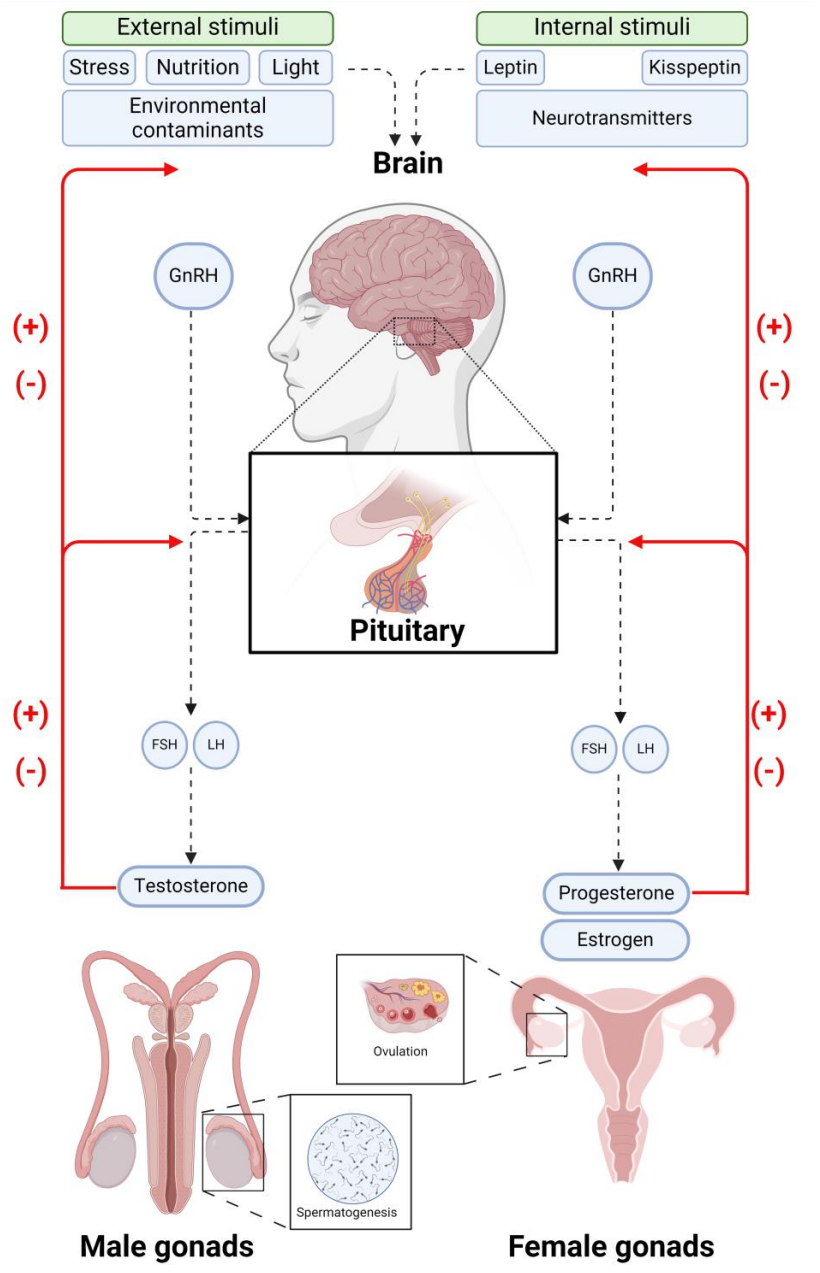
Brain-pituitary-gonadal (BPG) axis



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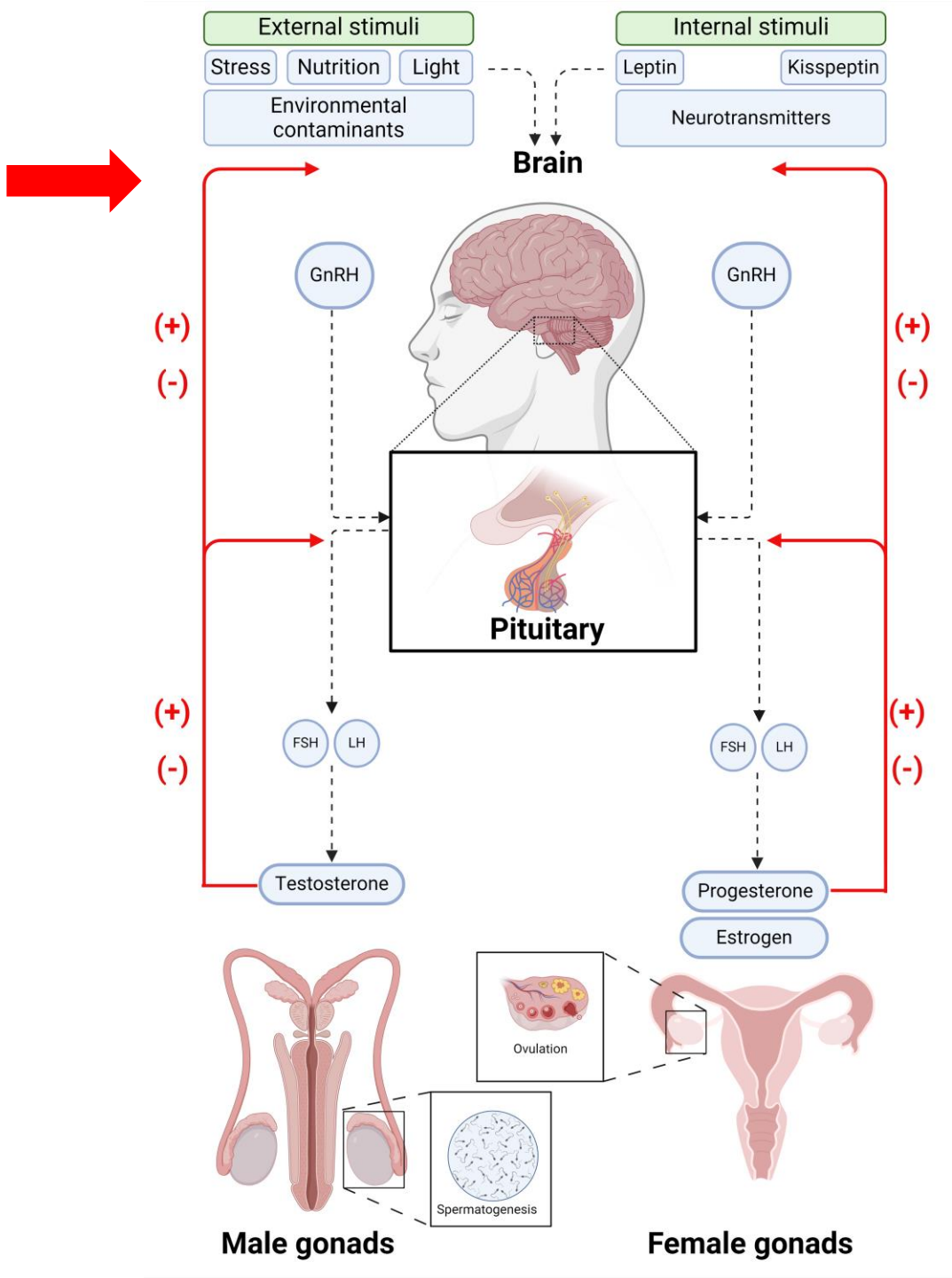
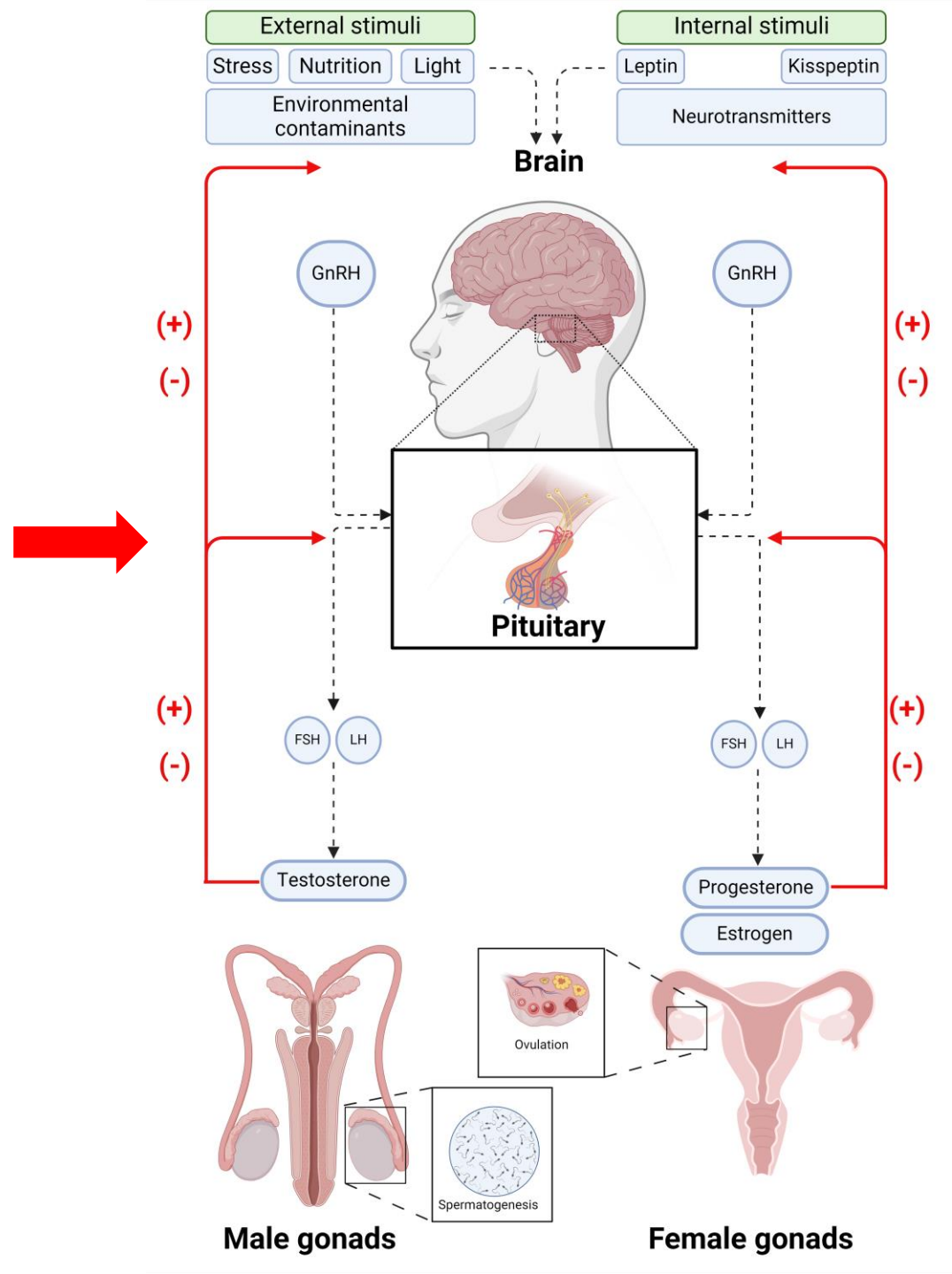
Brain-pituitary-gonadal (BPG) axis

- **Brain:**
  - Releases gonadotropin-releasing hormone (GnRH) in response to external and internal stimuli.



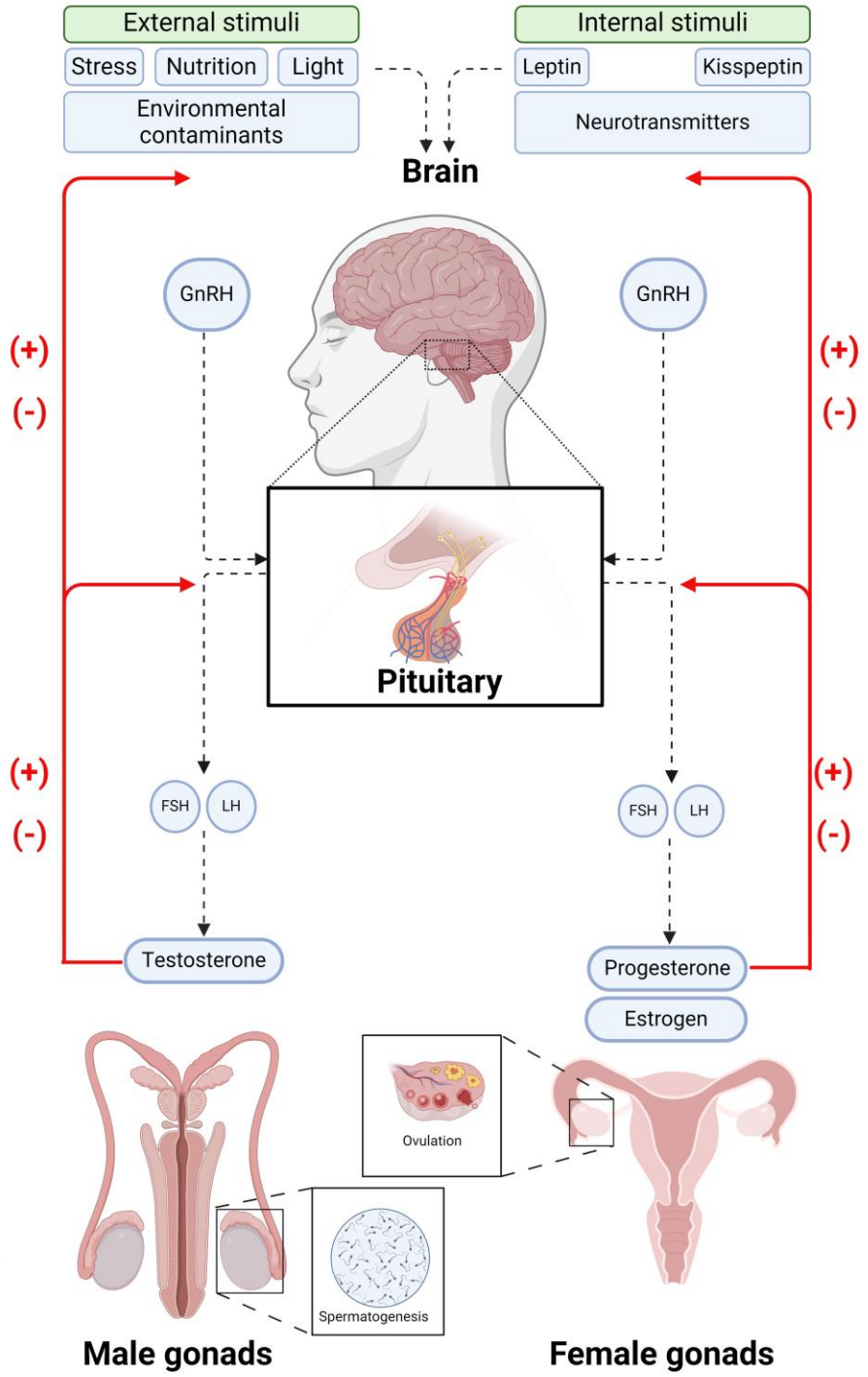
Brain-pituitary-gonadal (BPG) axis

- **Pituitary gland:**
  - Responds to GnRH by releasing Luteinizing hormone (LH) and Follicle-stimulating hormone (FSH)
  - These hormones travel through the bloodstream to the gonads

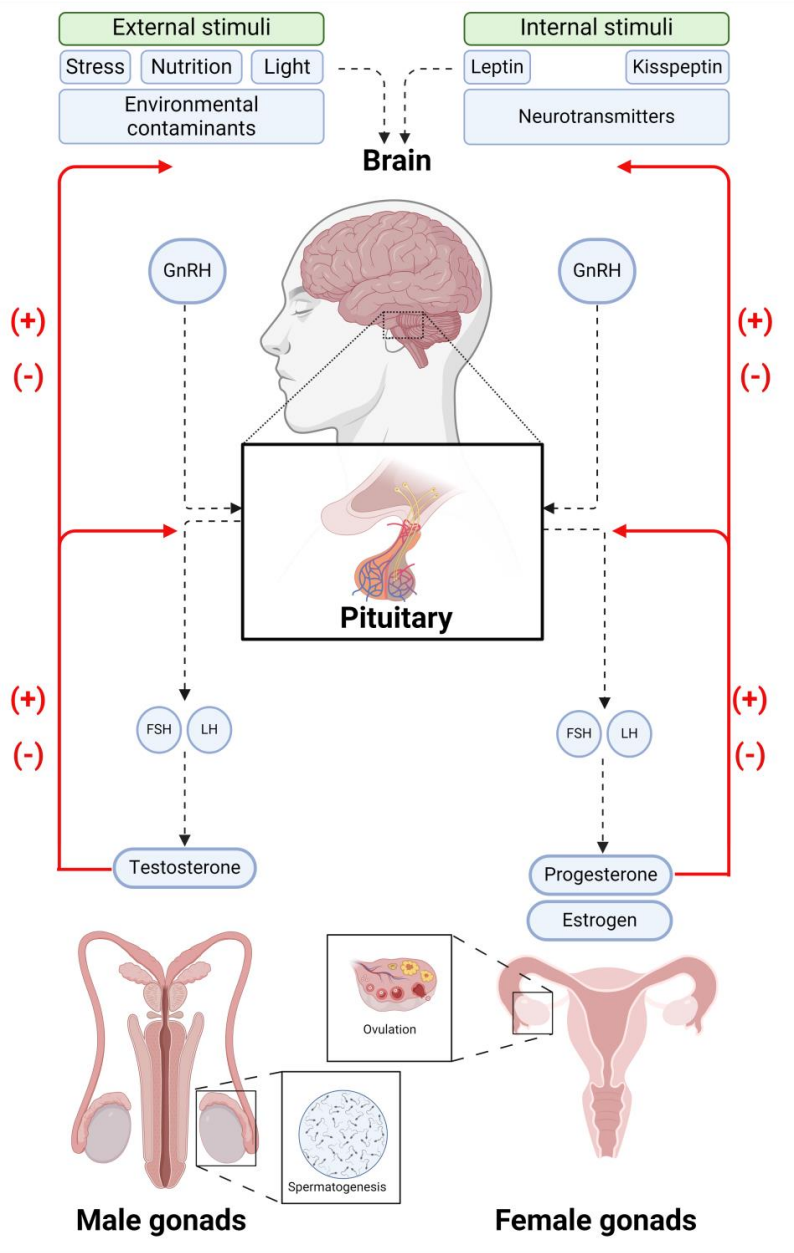


Brain-pituitary-gonadal (BPG) axis

- **Gonads**
  - Respond by producing sex hormones (testosterone, estrogen, and progesterone).
  - These hormones are responsible for sexual development and gametogenesis.



Brain-pituitary-gonadal (BPG) axis



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Endocrine-disrupting chemicals (EDCs)

EDCs are substances that **interfere** with the endocrine system.

Cosmetics

Water-repellent Clothing

Cleaning Products

Polyfluoroalkyl substances (PFAS), are an important group of EDCs that:
- Bioaccumulate in organisms
- Resist degradation

Fish

Water

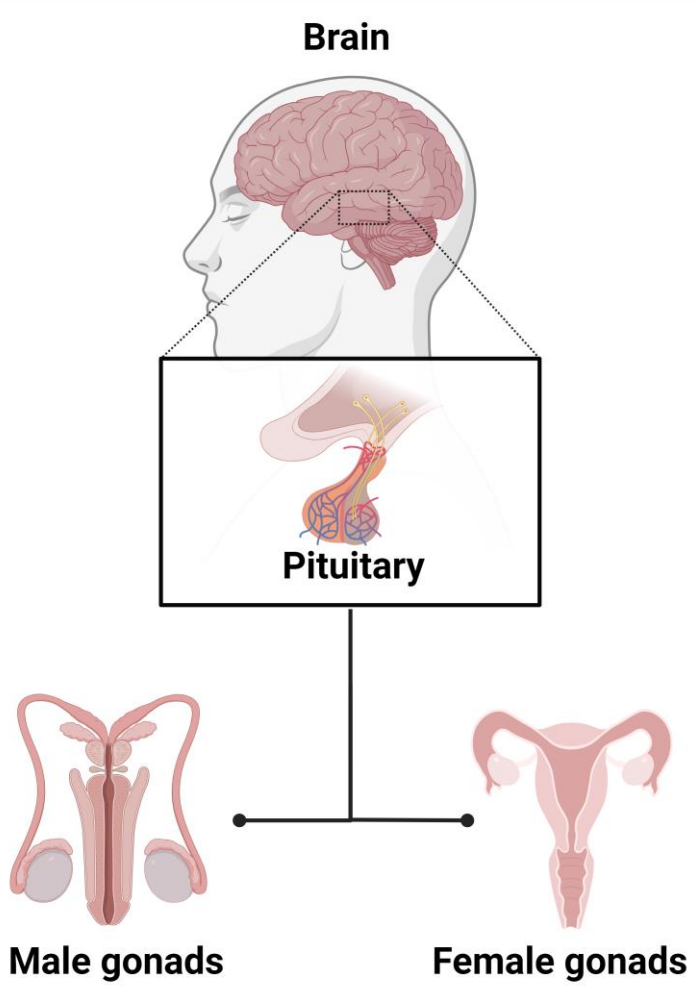
Food processing/packaging

How do EDCs cause endocrine disruption?

Interference with hormone **synthesis**

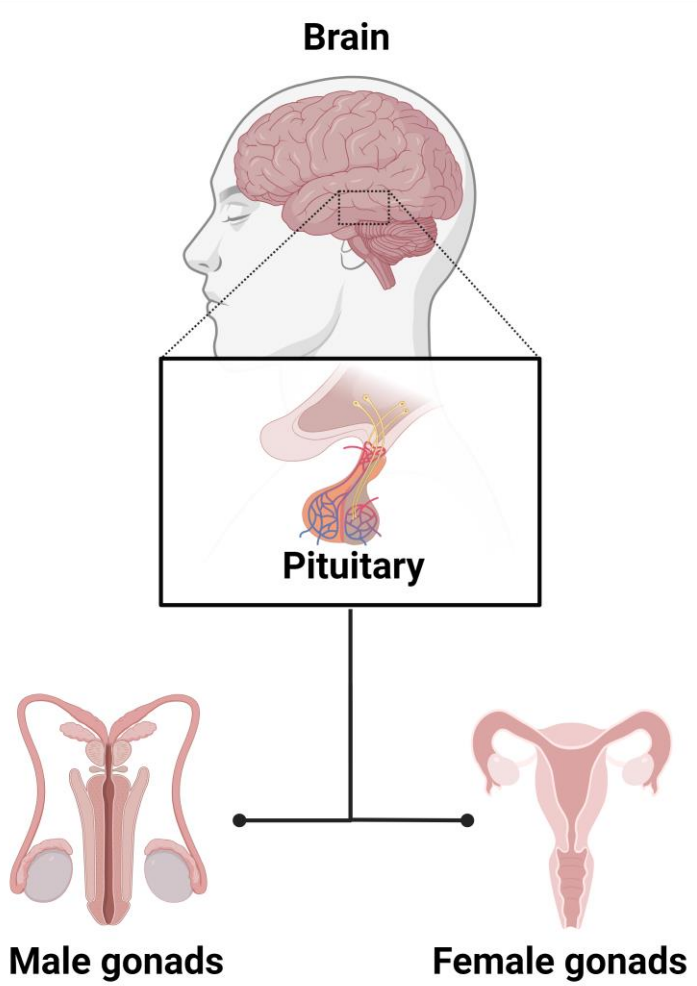
Interference with hormone **transport**

Interference with hormone **storage**

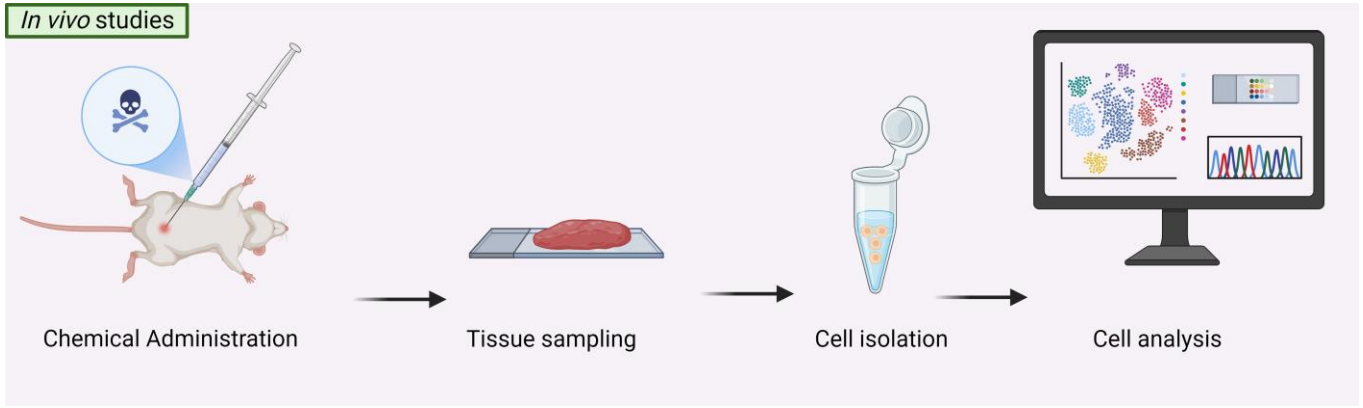


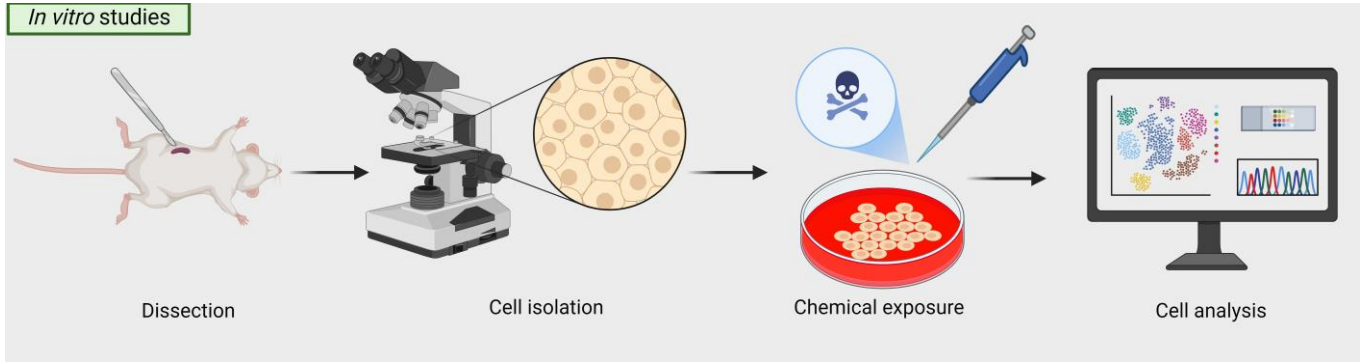
How do EDCs cause endocrine disruption?

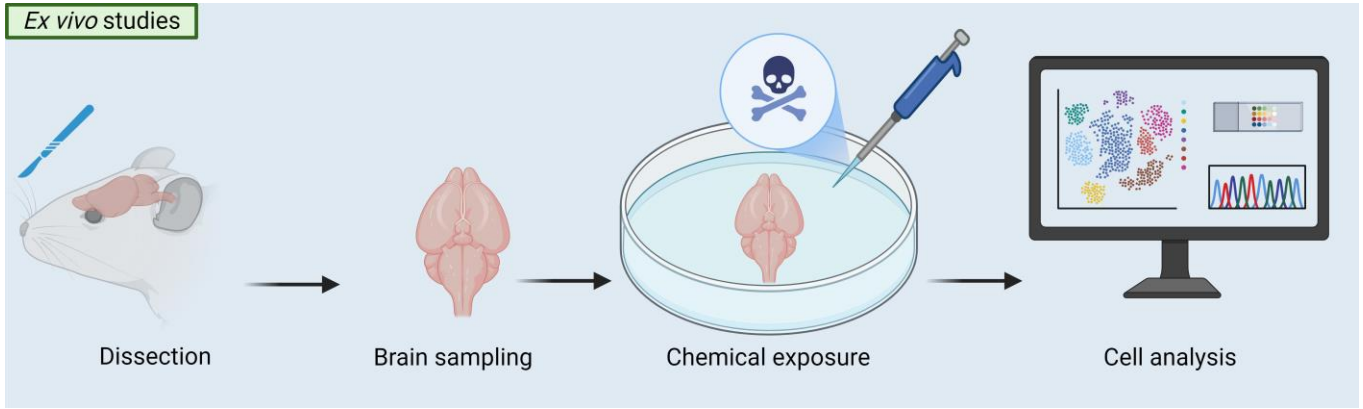
Interference with hormone **synthesis**



Experimental models for toxicology studies







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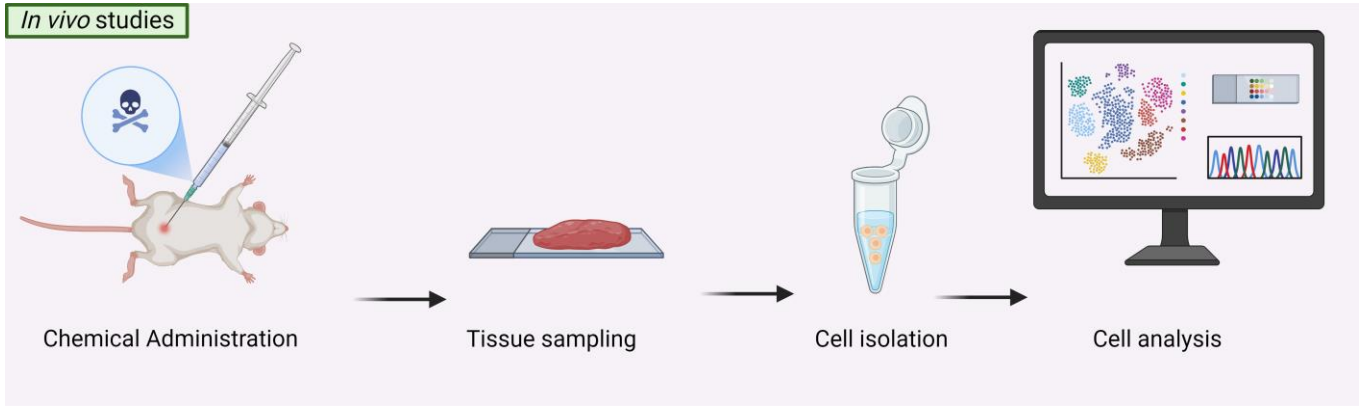

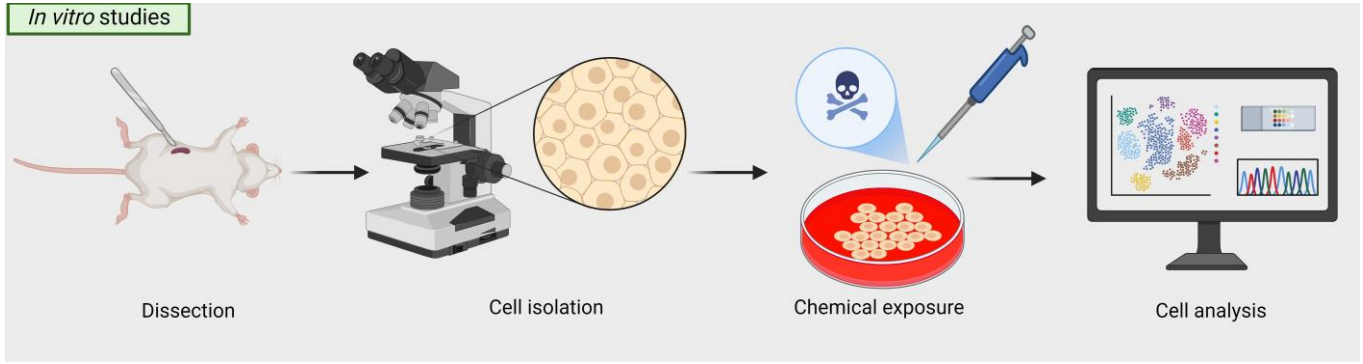

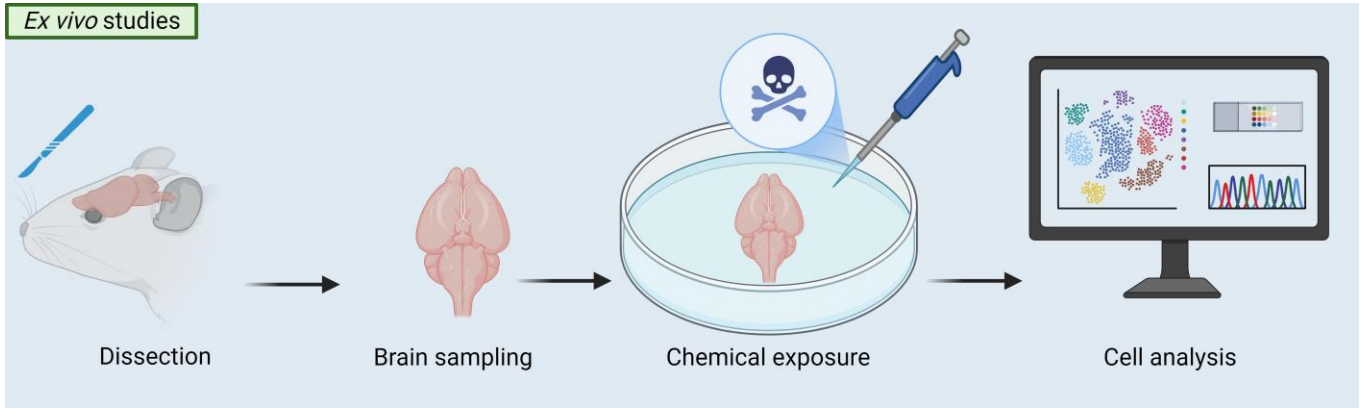

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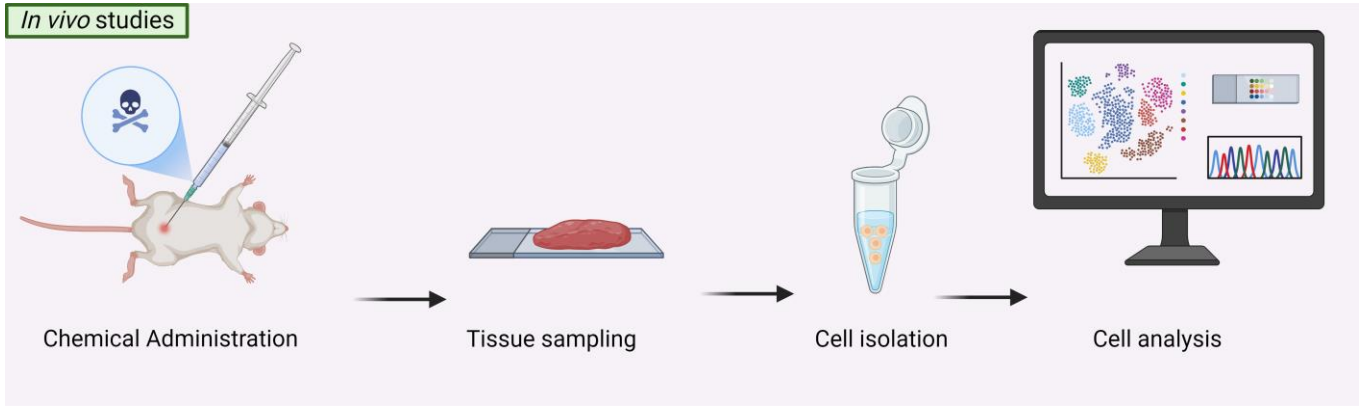

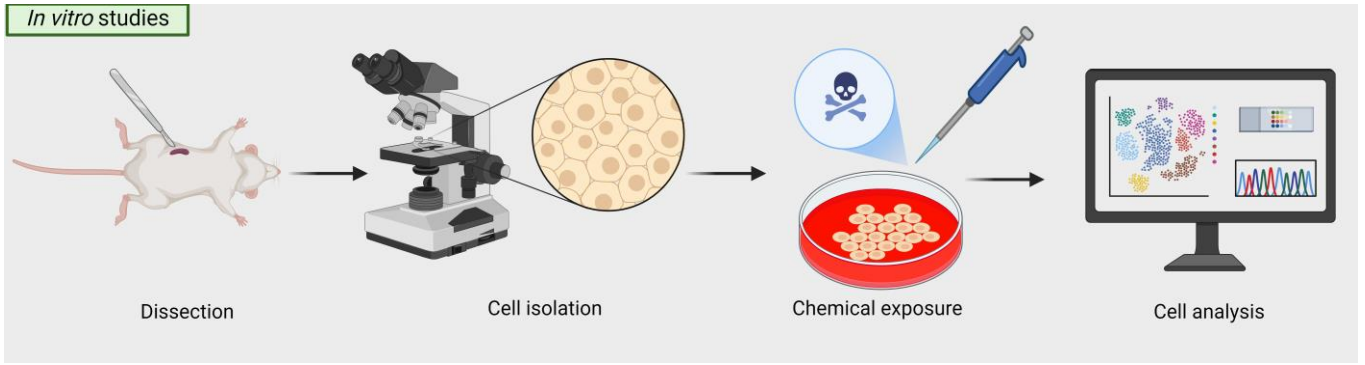

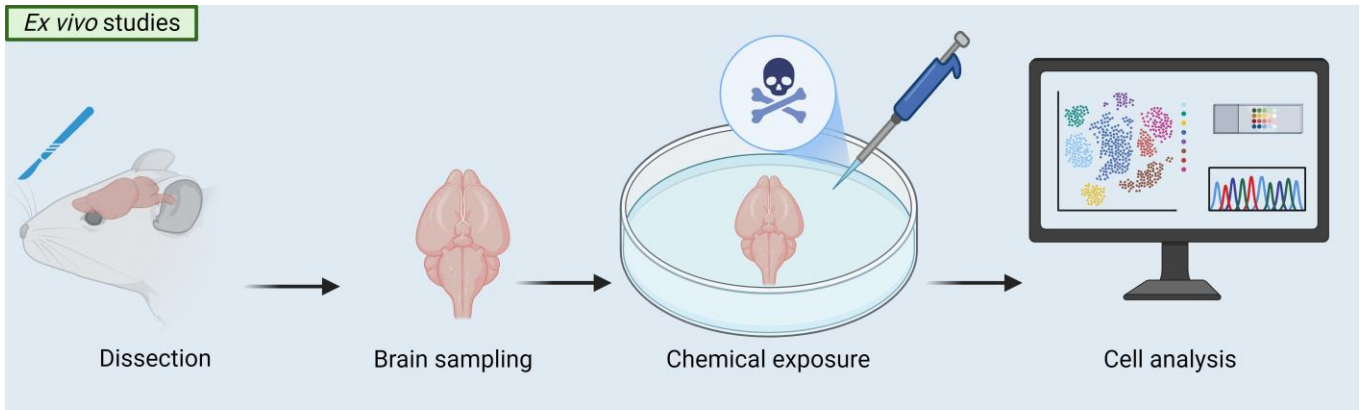

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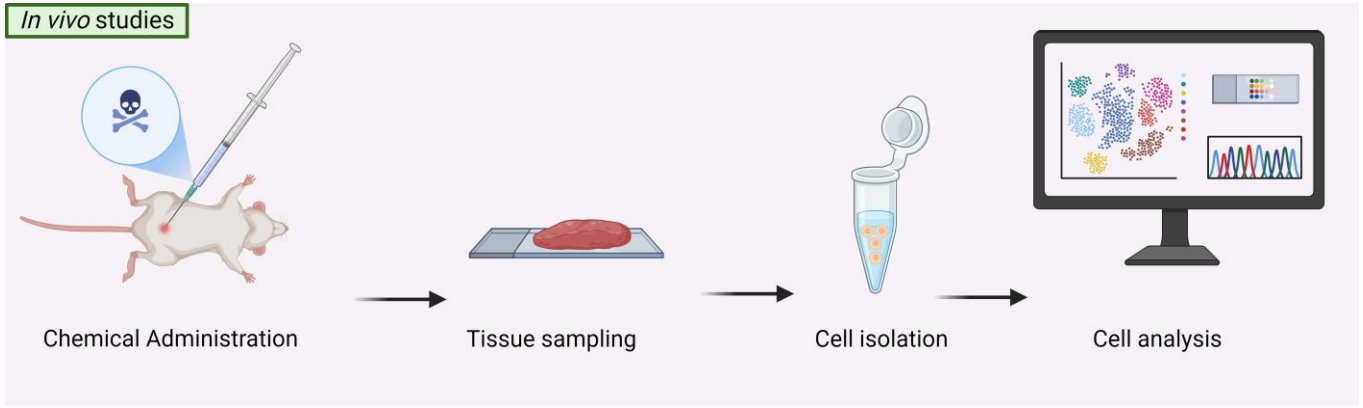
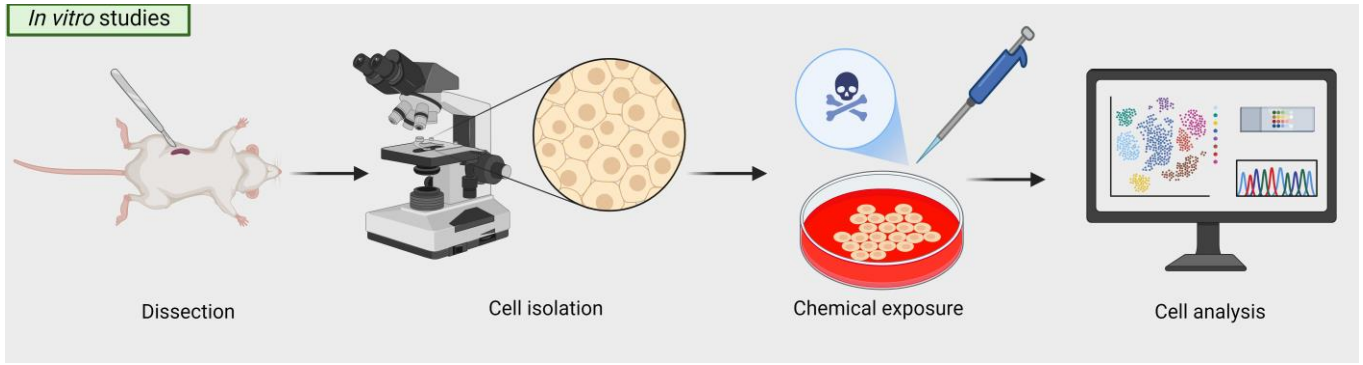
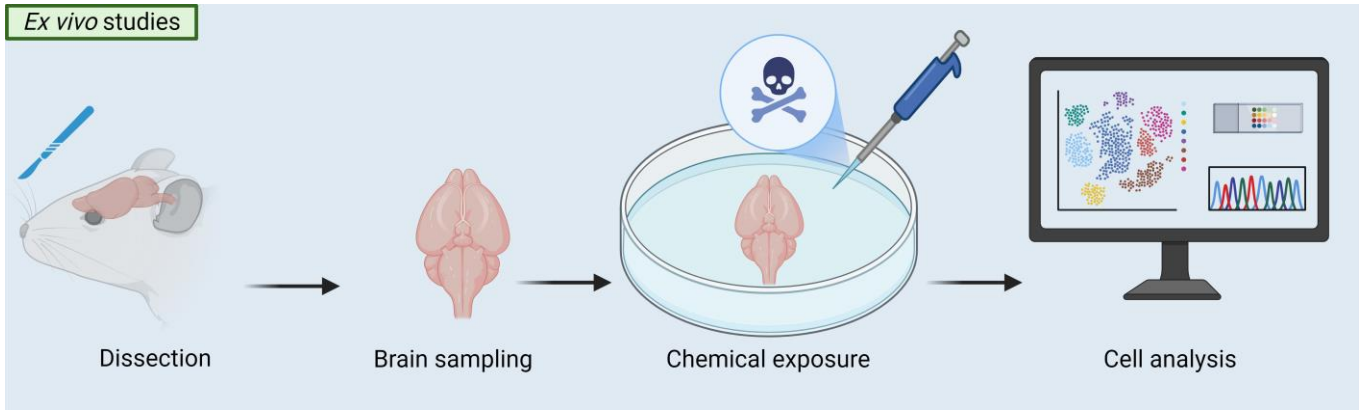
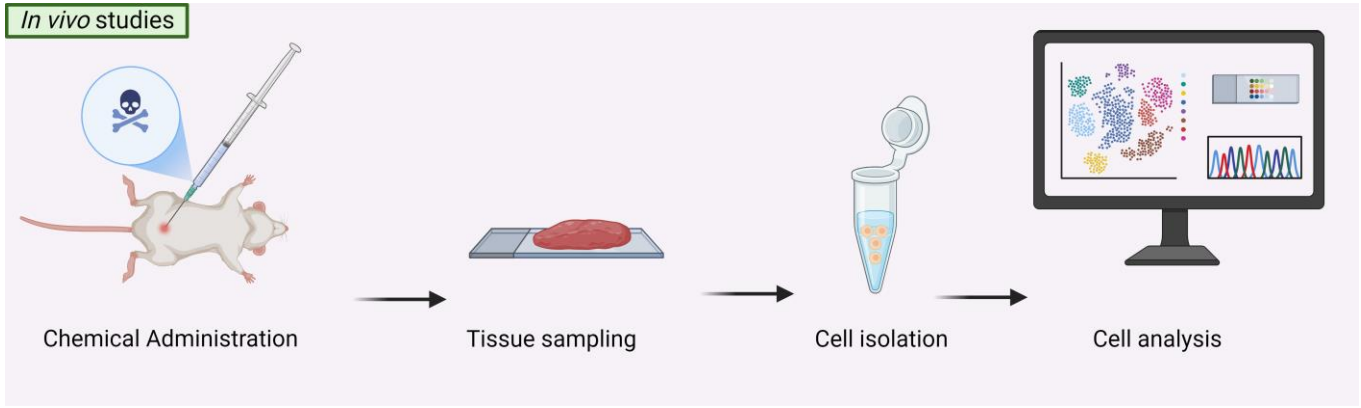
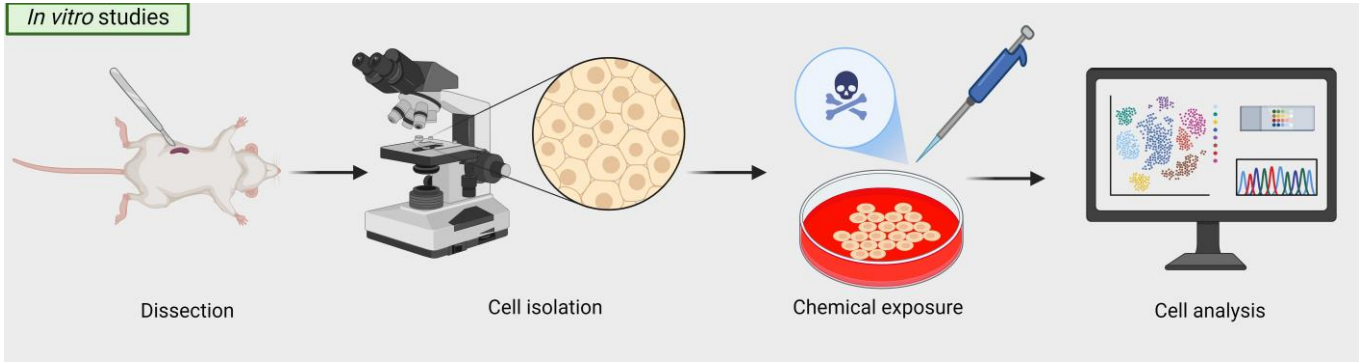


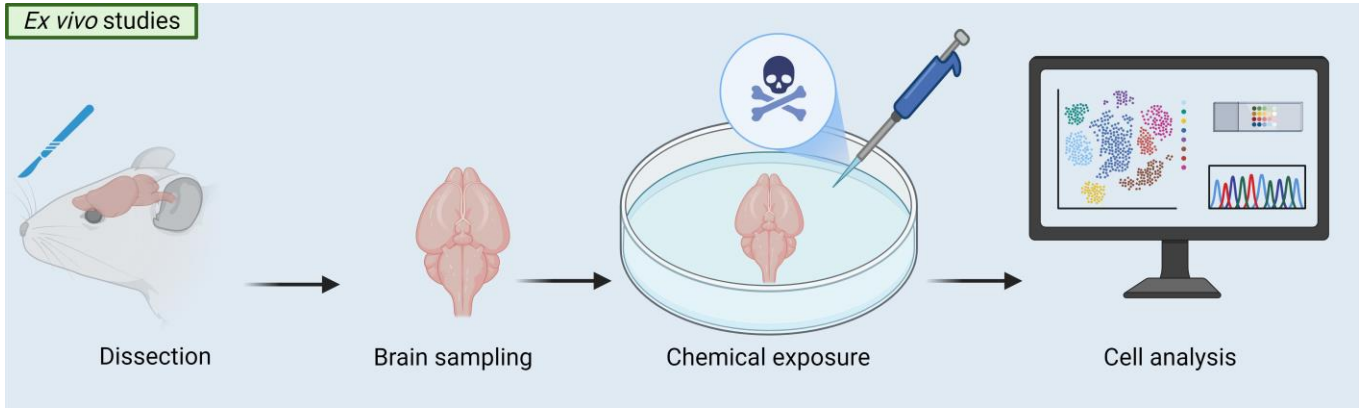


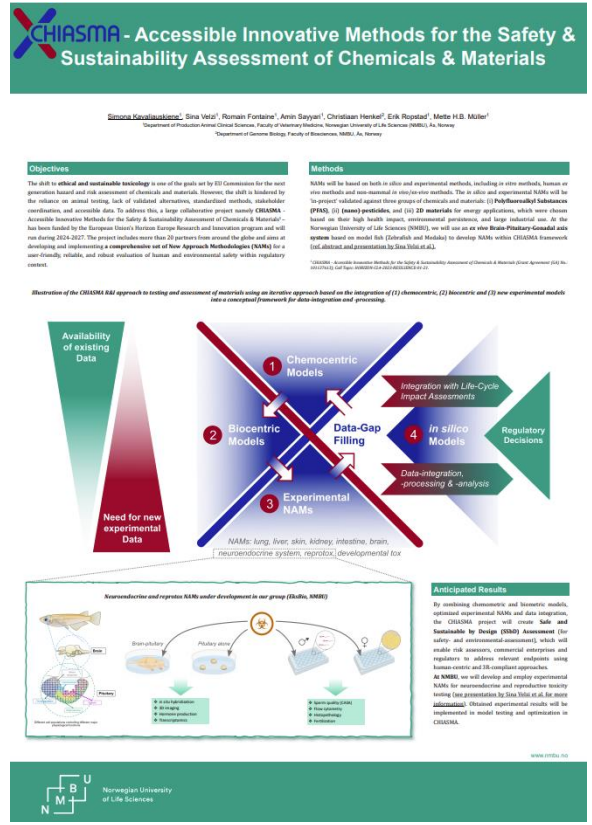


Experimental models for toxicology studies



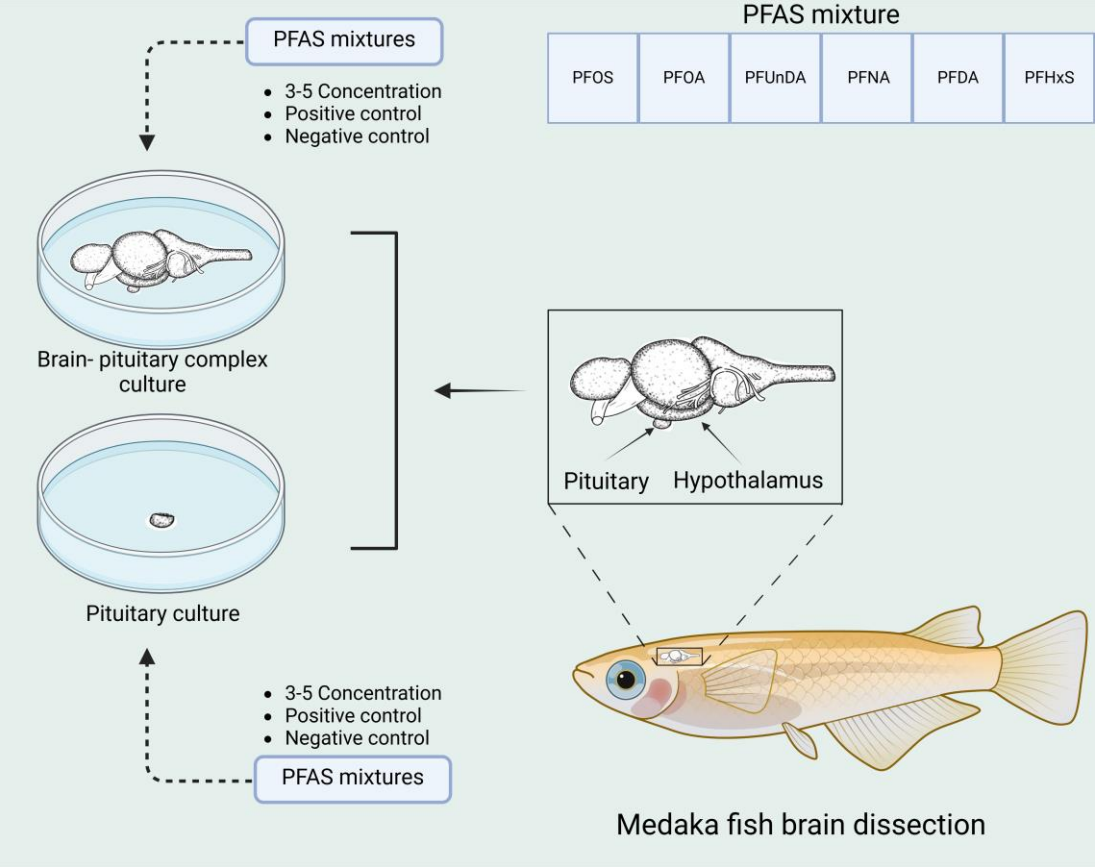




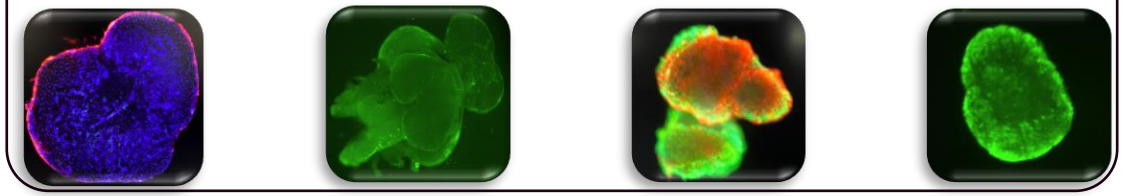


Poster ID **PT9** by Simona Kavaliauskiene et al.

Ex vivo brain-pituitary model



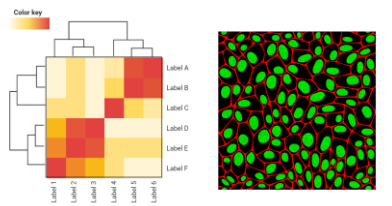
Brain/pituitary cell viability:



This method has a current viability of up to **2-5 days** is particularly important for testing chemicals that may impact the BPG axis.

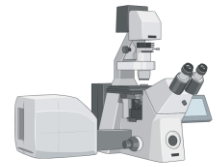
Methods to be applied

Gene expression effects:



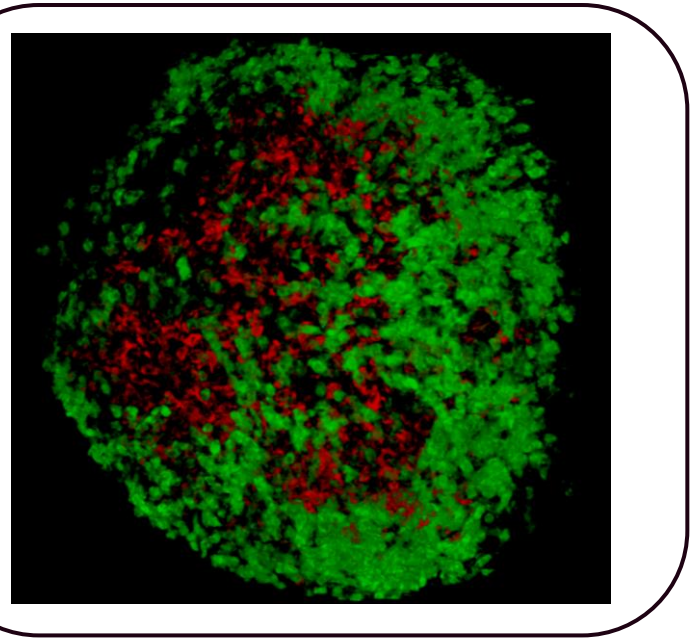
RNA seq

Fluorescent *in situ* hybridization

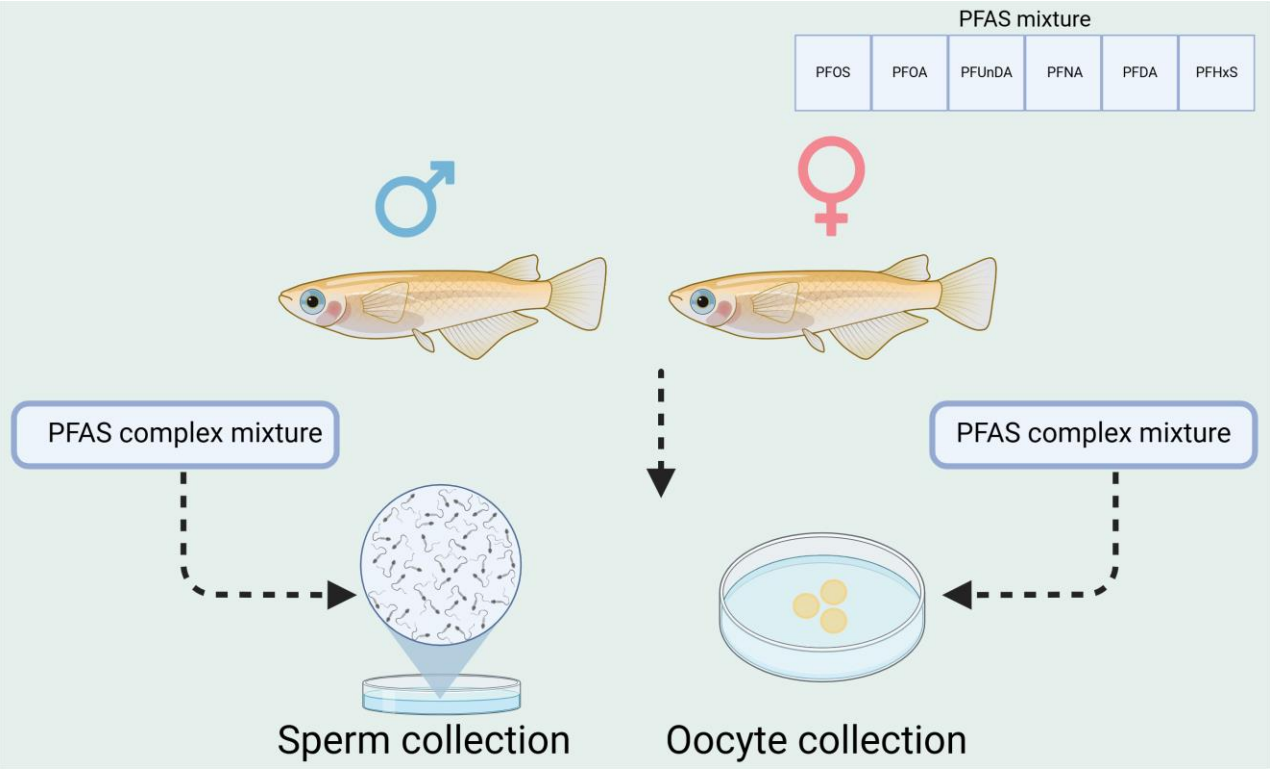


3D confocal microscopy

Changes in cell numbers in transgenic line:

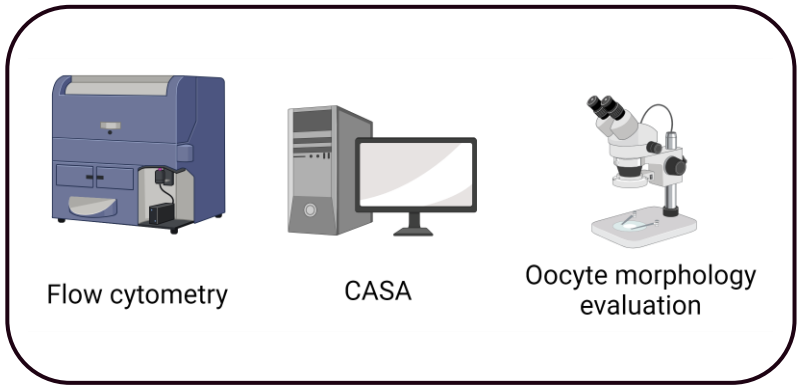


In vitro gamete toxicity models



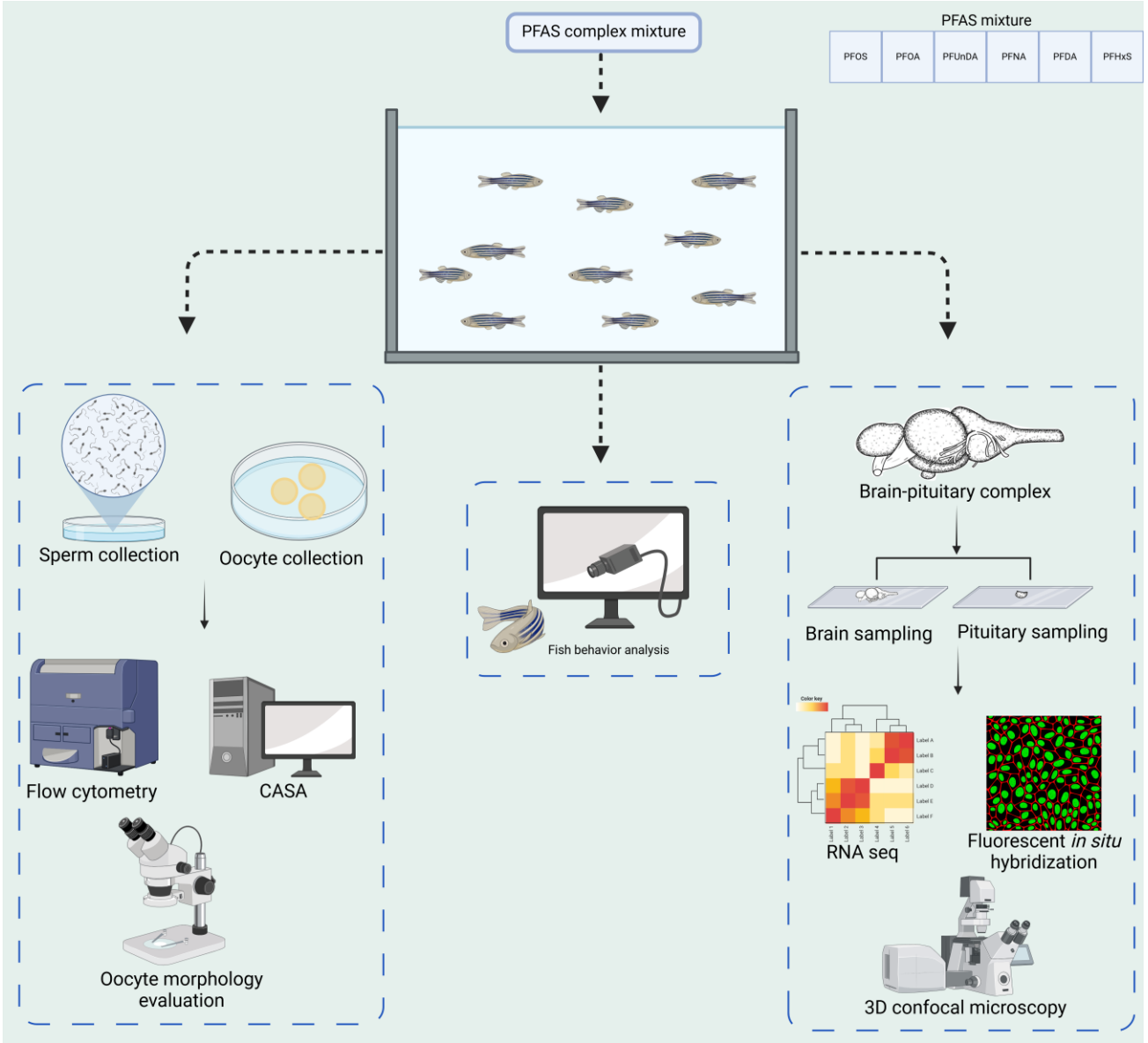
Methods to be applied

Sperm/oocyte quality evaluation:



Validate the brain-pituitary and gamete model

Validate the brain-pituitary and gamete model



Acknowledgment

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