

# Endocrine Disruption in Hornyhead Turbot

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# Background: CECs

## Contaminants of Emerging Concern

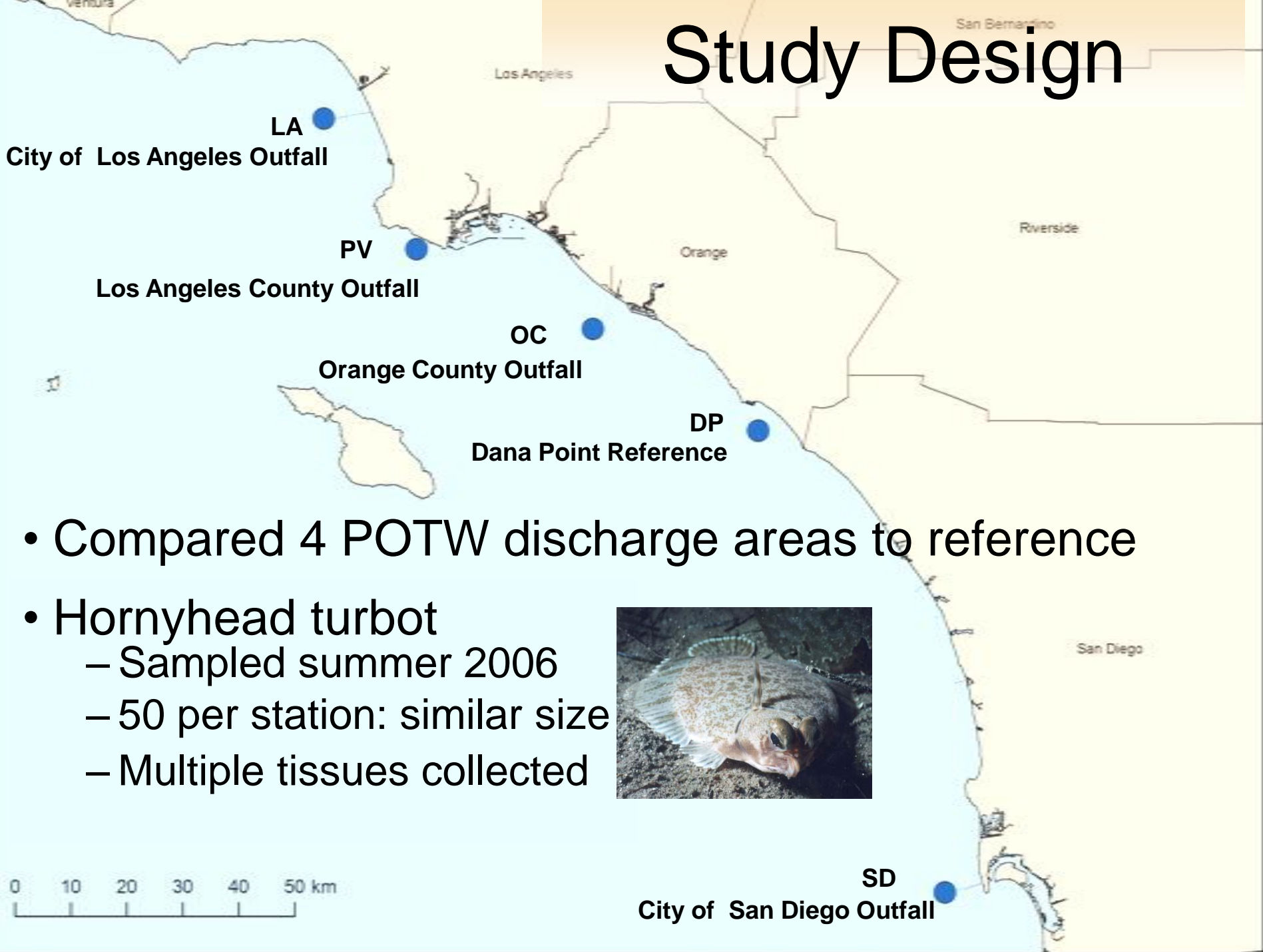
- Great number of unmonitored chemicals
  - Present in environment from multiple sources
- Cannot assess environmental significance with chemistry alone
- Need to determine if organisms are affected



# Previous Studies

- Exposure to near outfall sediment induced vitellogenin in farmed male California halibut (*Paralichthys californicus*)
  - Estradiol & alkylphenols in sediments
- Vitellogenin & testis-ova present in English sole (*Pleuronectes vetulus*) & hornyhead turbot (*Pleuronichthys verticalis*) males
  - Males with testis-ova collected near POTW discharges

# Study Design

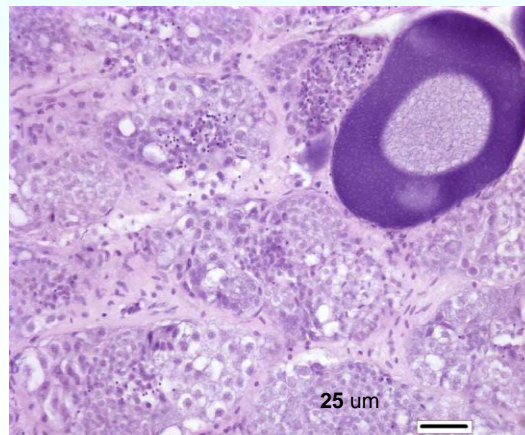


- Compared 4 POTW discharge areas to reference
- Hornyhead turbot
  - Sampled summer 2006
  - 50 per station: similar size
  - Multiple tissues collected



# Systems Evaluated

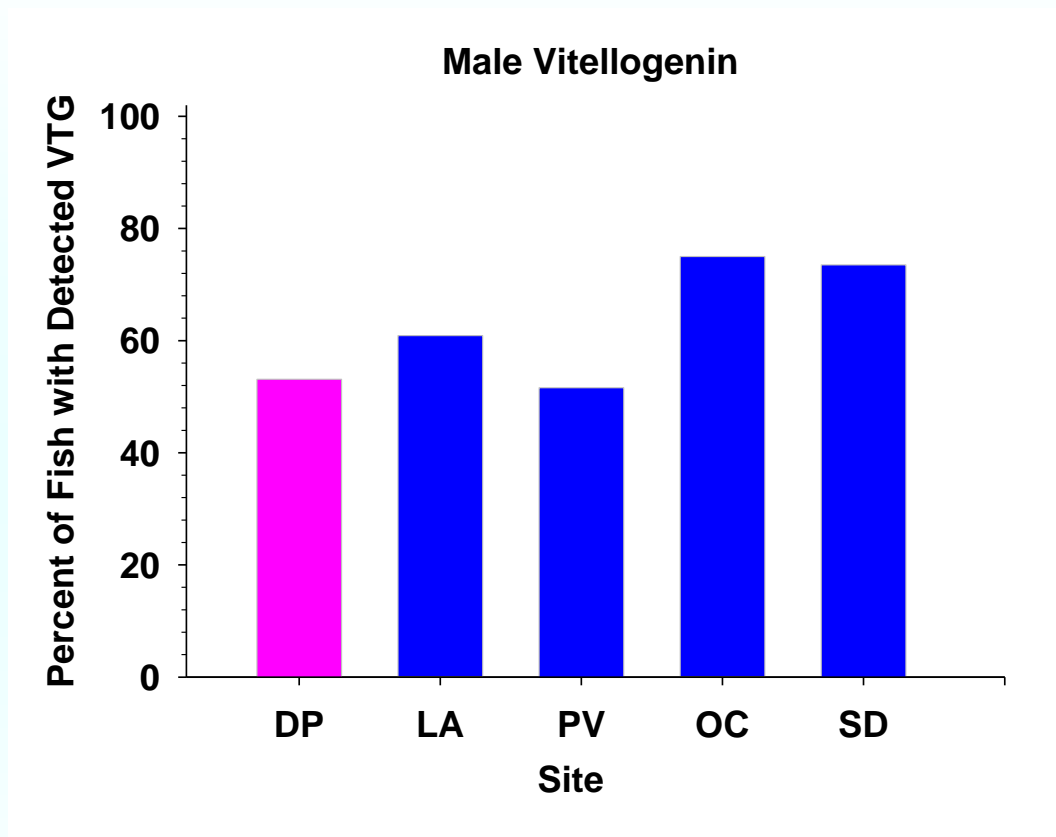
1. Reproductive: **VTG & testis-ova** (investigated in previous studies)
  - **Vitellogenin** (VTG) / female egg yolk protein
    - Produced in males when exposed to estrogen like compounds
  - **Testis-ova** / eggs in male testis
    - Feminization effect which alters gonad structure



# Systems Evaluated

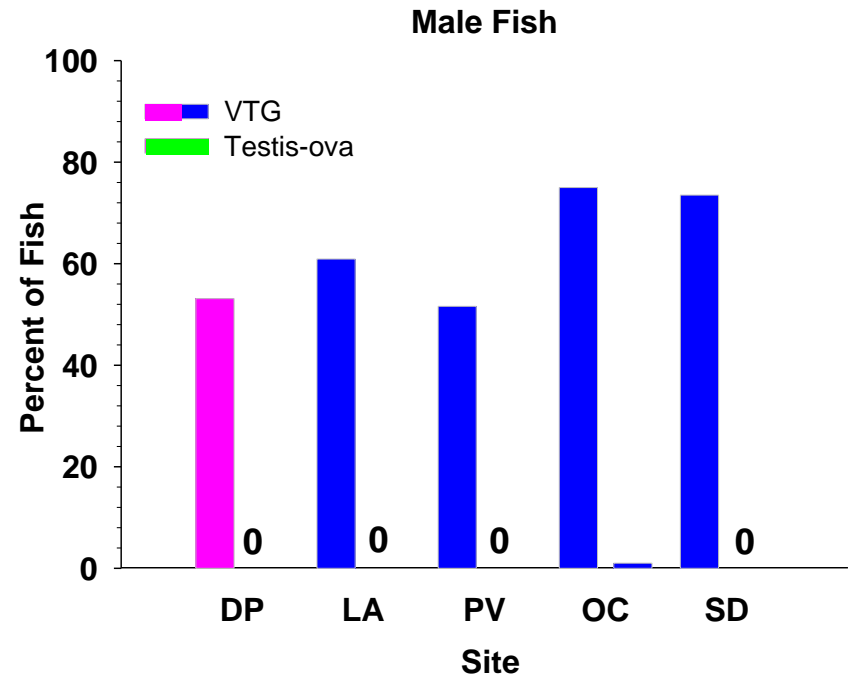
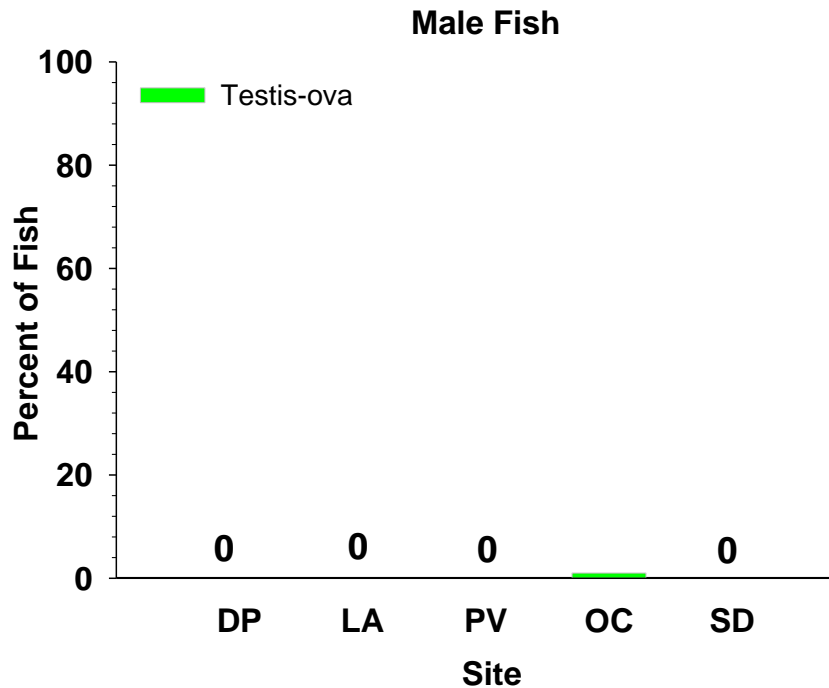
2. Glucocorticoid: **Cortisol** / metabolic regulator
  - Baseline concentrations changes used to assess responses to different stressors
  - Prior data for other flatfish species
  
3. Thyroid: **Thyroxine (T4)** / metabolic regulator
  - Baseline concentration changes used to assess potential effects in development
  - Known to be affected by CECs (e.g. PBDEs)

# Results: VTG



- VTG detected in males from all sites
  - Male VTG concentrations 100 times lower than females
- No apparent effect from POTW discharge areas

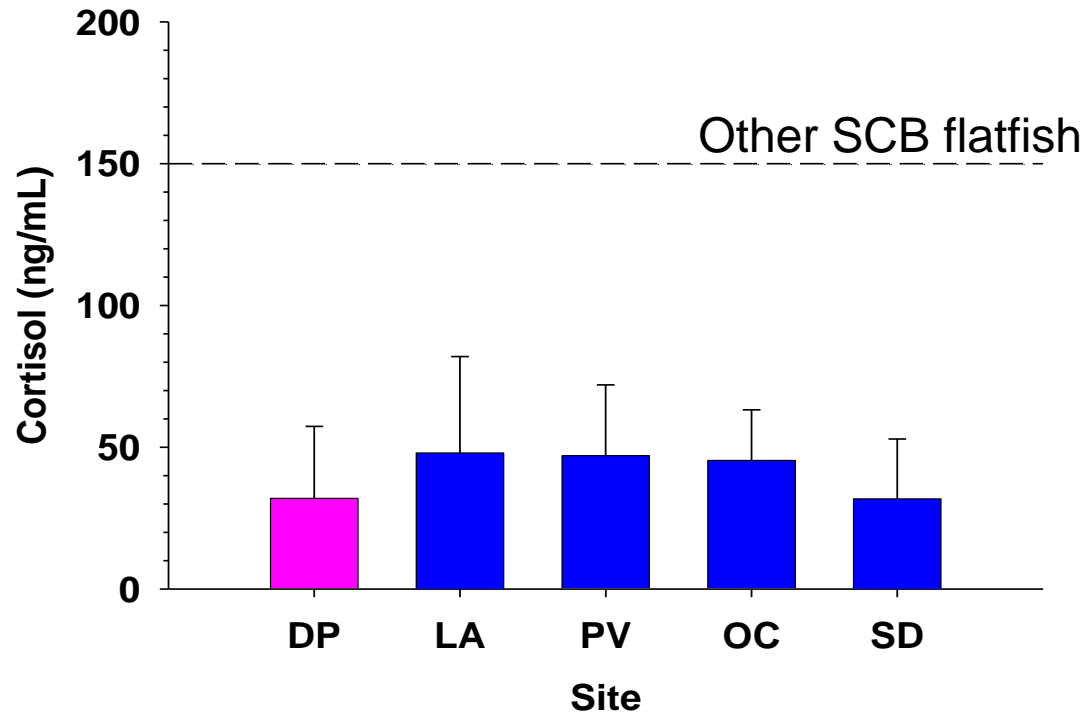
# Results: Testis-ova



- Low occurrence (1/145)
- No apparent association with POTW discharges
- Potential exposure (VTG presence) but virtually no gonad effects

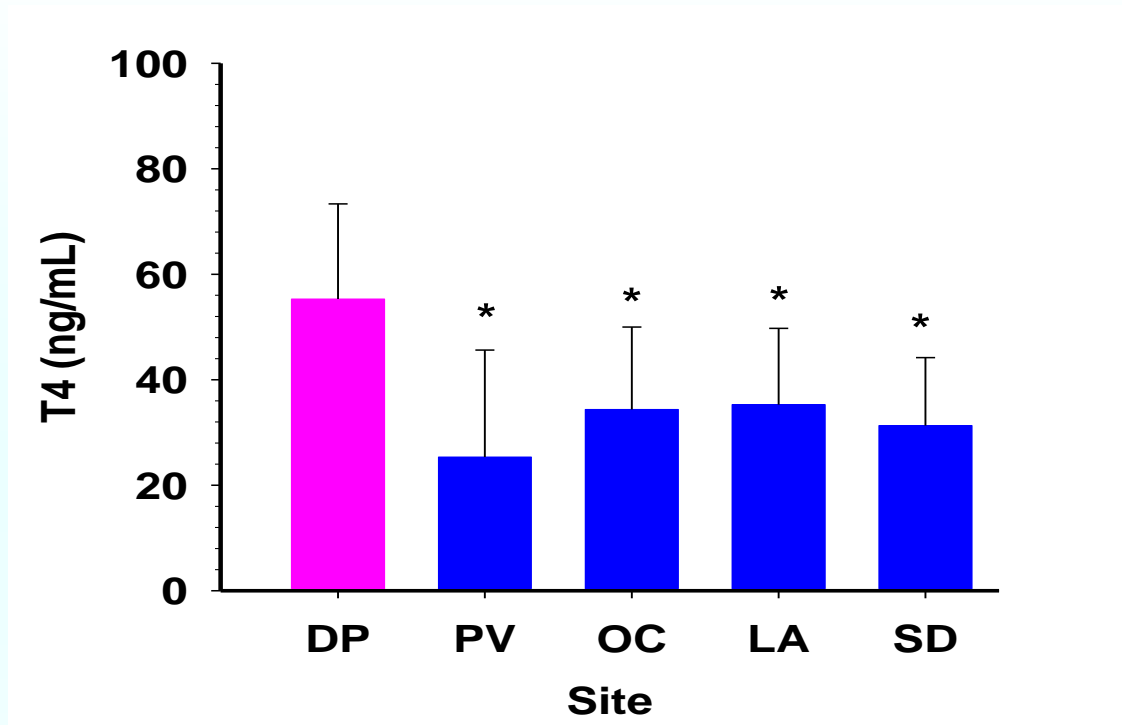


# Results: Cortisol



- Similar concentrations at DP & POTW discharge areas
- Cortisol concentrations do not appear to be affected by POTW discharges

# Results: Thyroxine (T4)



- T4 concentrations higher at DP
- Lower T4 concentrations could be associated with POTW discharges

# Summary

- Little indication of endocrine disruption
- Very little association between responses & POTW discharges

# Next Steps

- Determine baseline conditions
  - Sampling remote areas with fewer wastewater discharge inputs
  - Channel Islands & Northern SCB
- Investigate potential causes
  - Lab exposures to effluent & individual CECs