Mechanism Stimulateable Fish Sex Reversal with Plants Extract Solution

By

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Introduction

- Fish sex reversal has benefit for aquaculture
- Why are fish farmers want to fix fish sex ?

male Tilapia is grow faster than female

female Climbing Perch is bigger morphology than male

female sturgeon only can produce caviar egg

Male fancy fish groups was beautifully than female

Fish farmer want to monosex culture

Using energy of fish

1. Natural fish

- **living** → – Movement
  – Muscle work
  – Body function
  } 2/3
- **Growth + Reproduction** → 1/3

2. Culture fish

- Growth ↑ (1/3 of energy)
- ~~Reproduction~~

Why are fish farmers want to fix fish sex ?

Answer : for receive more profitably

Trend of aquaculture

organic aquaculture

Reduce to use chemical of materials in culture system

Present fish sex reversal

synthetic analogs hormone

- 17 α methytestosterone
- 17 β estradiol

many researcher team to search method reduced synthetic analogs hormone contaminanted to water environments

- Tilapia sex reversal with shaker table (Penpun, 2001)
- Mangosteen leaves on sex – reversal in Nile Tilapia (*Oreochromis niloticus*) (Suthip *et. al*., 2011)

interesting review information about mechanism stimulateable fish sex reversal with plants extract

Materials and Methods

The objective of this present is to review the fish's functioning mechanisms when stimulated by phytoandrogen and phytoestrogen hormone group obtained from plants extract.

Result and Discussion

Fish reproduction have 3 types

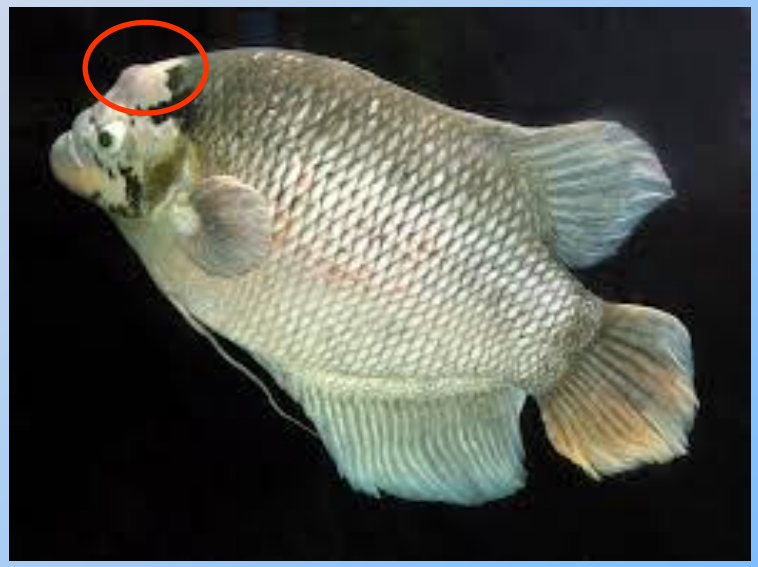
1) Bisexual reproduction
2) Hermaphroditism
3) Parthenagenesis

select fish sex differentiation from morphology

size

colour

hump



hook mouth

Endocrine of fish

Hypothalamous

↓

Pituitary gland

2 types

↓

Platybasic Pit. Gl.

Leptobasic Pit. Gl.

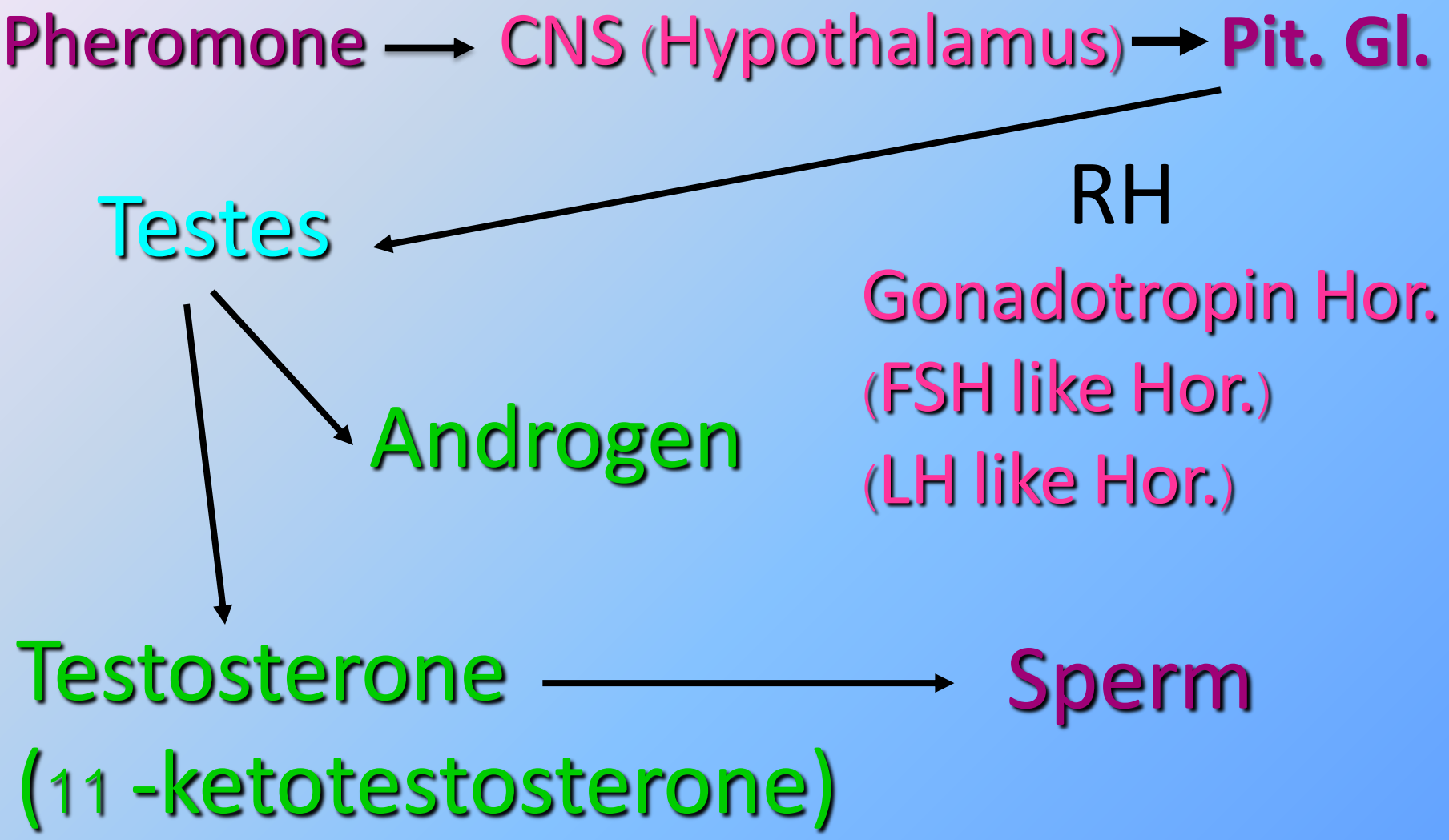
↓

Hormone producing cell type

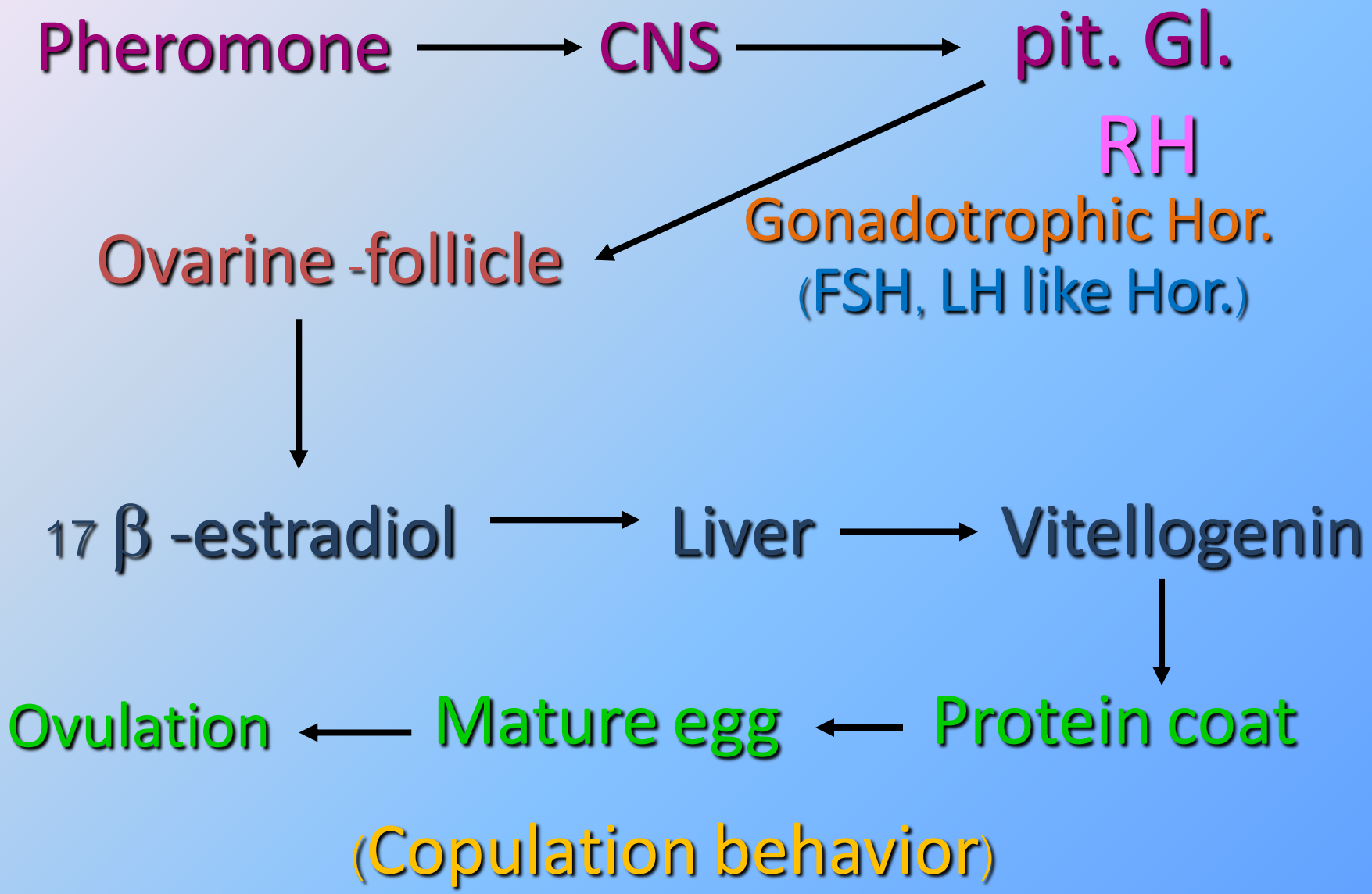
↓

One cell type one hormone

Male fish


Pheromone
CNS (Hypothalamus)
Pit. Gl.
RH
Gonadotropin Hor.
(FSH like Hor.)
(LH like Hor.)
Testes
Androgen
Testosterone
(11 -ketotestosterone)
Sperm

Female fish


Pheromone
CNS
pit. Gl.
RH
Gonadotrophic Hor.
(FSH, LH like Hor.)
Ovarine -follicle
17 β -estradiol
Liver
Vitellogenin
Protein coat
Mature egg
Ovulation
(Copulation behavior)

Control factors of fish reproduction

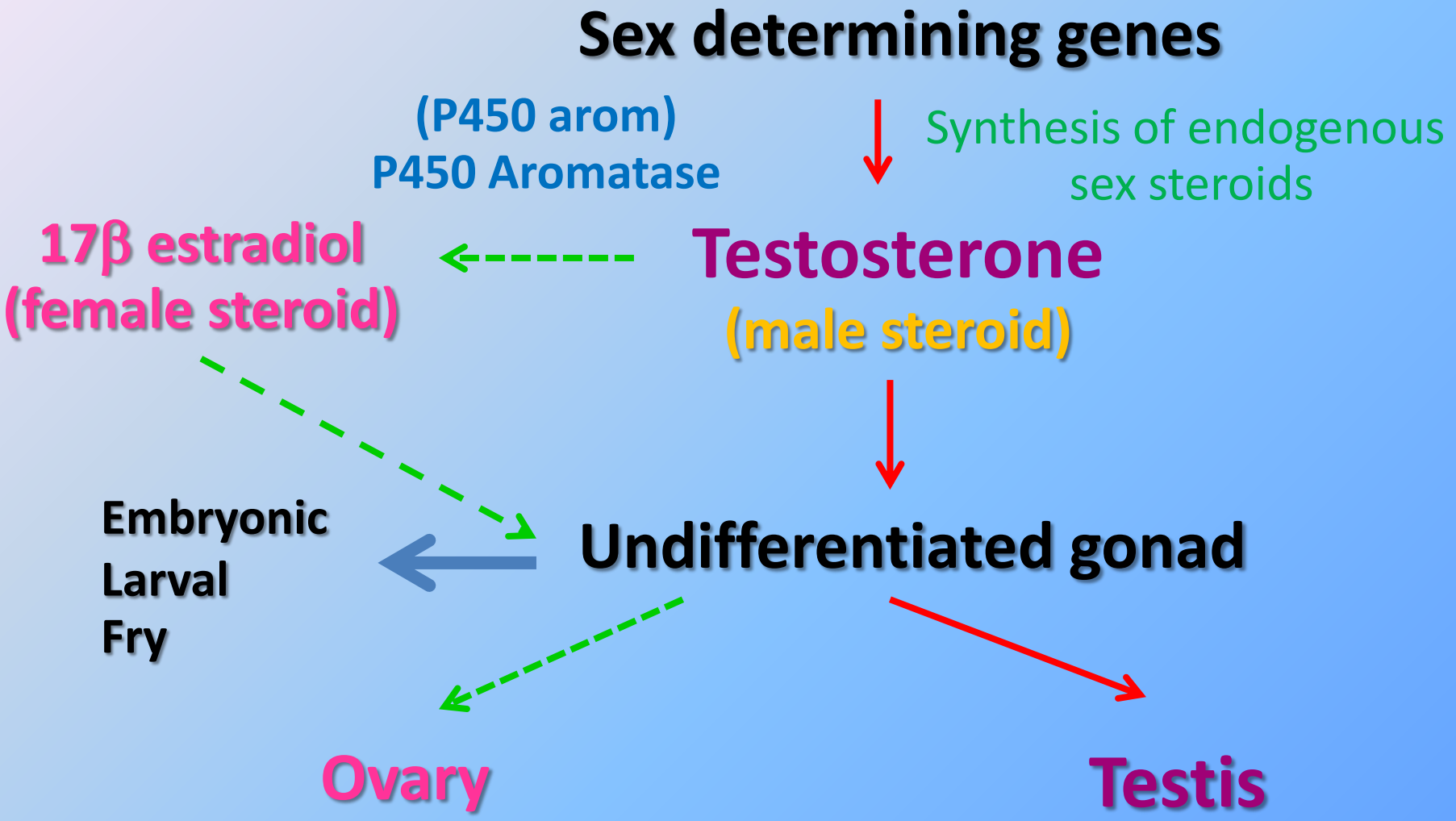
external factors

Photoperiod
water temperature
water quality
water current
Tides
spawning substrate
Nutrition
disease

internal factors

mechanism of fish body that regulates

Differential steroidogenesis



External effect on sex differentiation

(TSD) Temperature dependent sex →

High tem.

Low temperature → *Odontesthes bonariensis*
Patagonina hatcheri

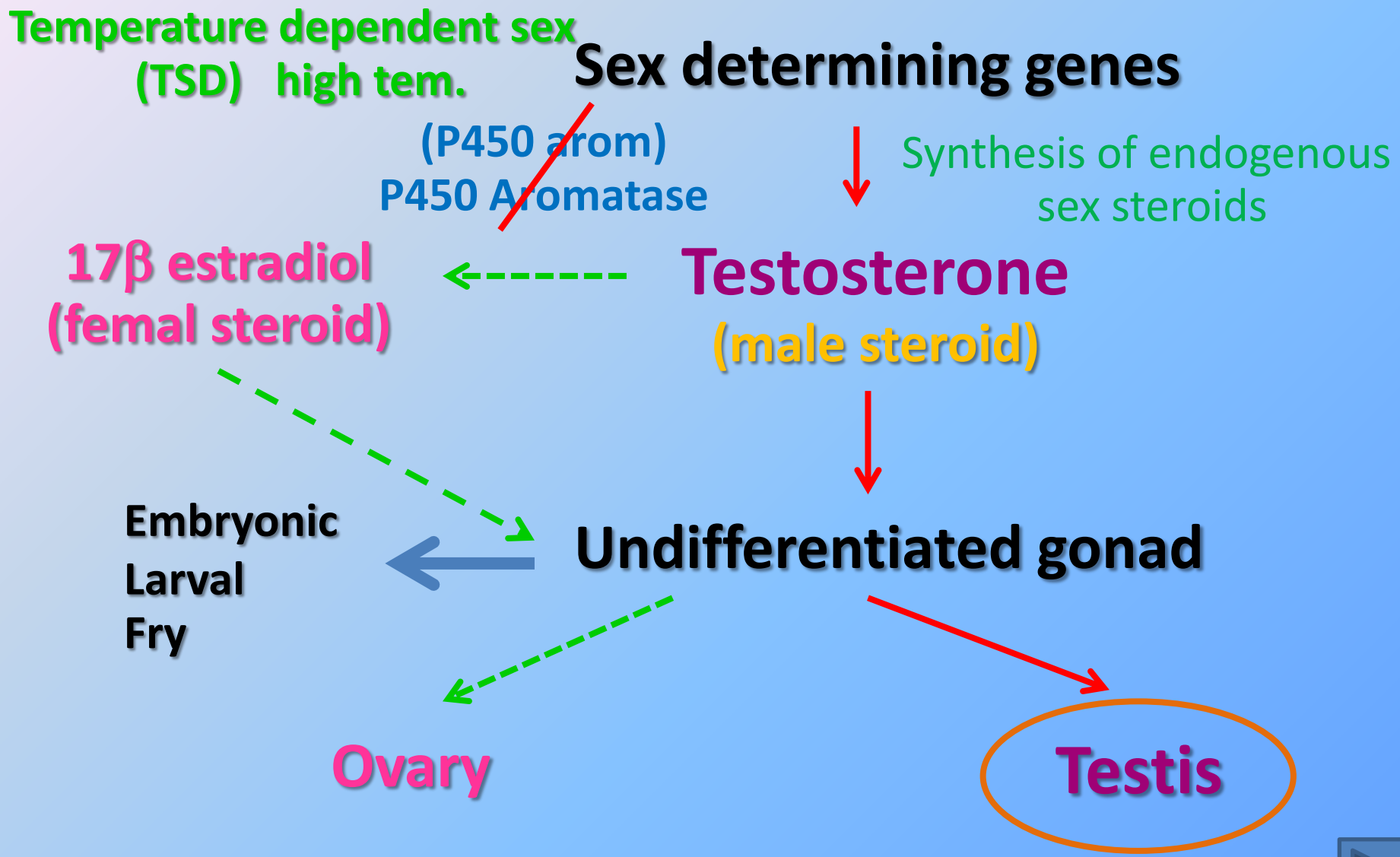
Exogenous steroids → **Androgen** **Estrogen**

method : immersion diet

Various : stages, dosages, duration

pH less pronounced in fish sex reversal

Differential steroidogenesis



Pollution

cause serious involved

gonadal differentiation

Maturation of fish

Hormone from plants extract

Phytoandrogen

Mangoteen leaves

Eurycoma longifolia Jack

Butea superb Roxb

Phytoandrogen

- Used androstenedione (phytoandrogen) fed African catfish diets had better FCR and protein efficiency ratio than control group (Funda and Ihsan, 2005)
- Mangosteen leaves extract can Nile Tilapia sex reversal trends to induce higher male percentage (Suthip *et. al*., 2011)

Phytoestrogens

isoflavones

coumestans

lignans

Phytoestrogens

- used soybean meal fed diets on Nile tilapia larvae sex reversal found produced female 77% higher than 17 α-methytestosterone at 60 mg/kg diet (Abdel – Fattah *et. al*., 2012)
- estrogenic food ingredients may influence the sexual differentiation of fish

Salmon (*Oncorhynchus masou*) culture with Rush powder (*Juncus effuses* L.) as feedstuff

ACKNOWLEDGEMENTS

- I also would like to thank all administrators of Tokai University and Maejo University
- I also thank the students of the Bioresource Science help my research
- and I thank my advisor
  Professor Dr. Kiyotaka Kabata

Thank you