

# Reproduction in fishes



# Reproductive strategies

## bearers

- external bearers

mouth: males or females

some cichlids and bonytongues



# Reproductive strategies

## bearers

- external bearers

- internal bearers (viviparity)

  - facultative - killifishes

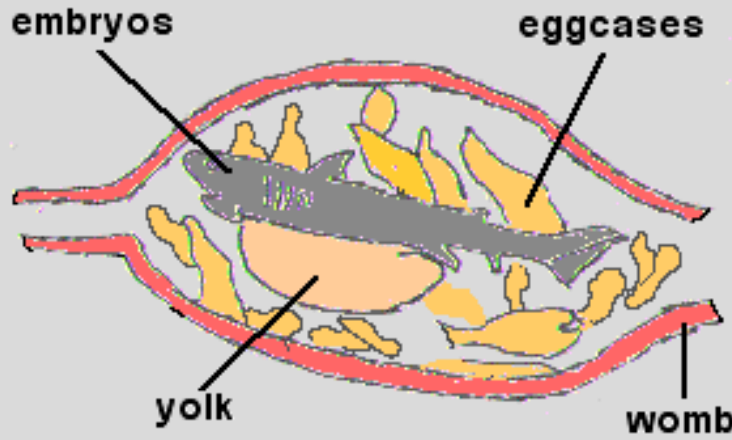
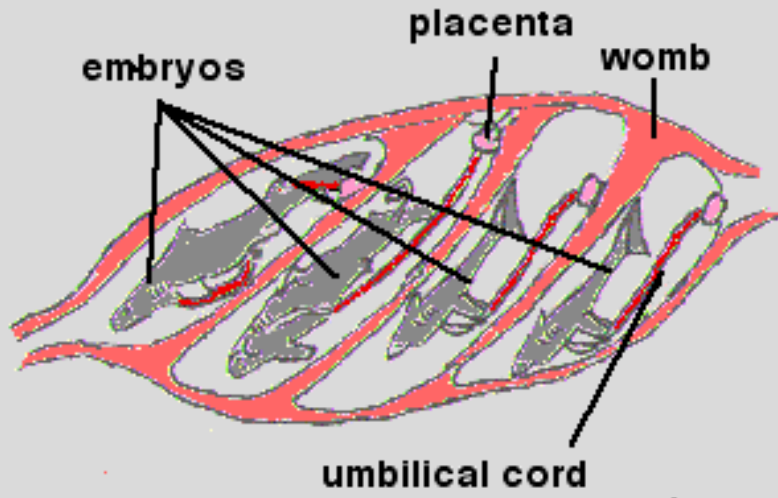
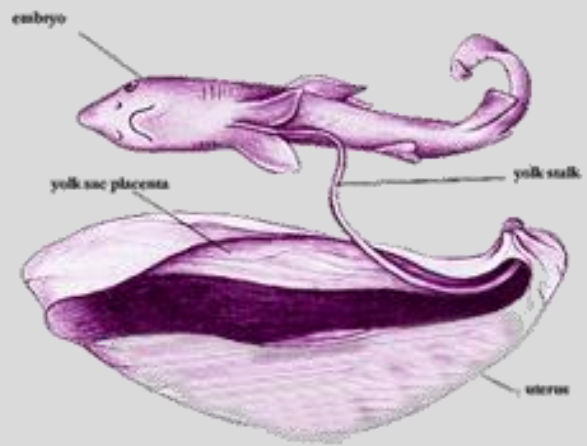
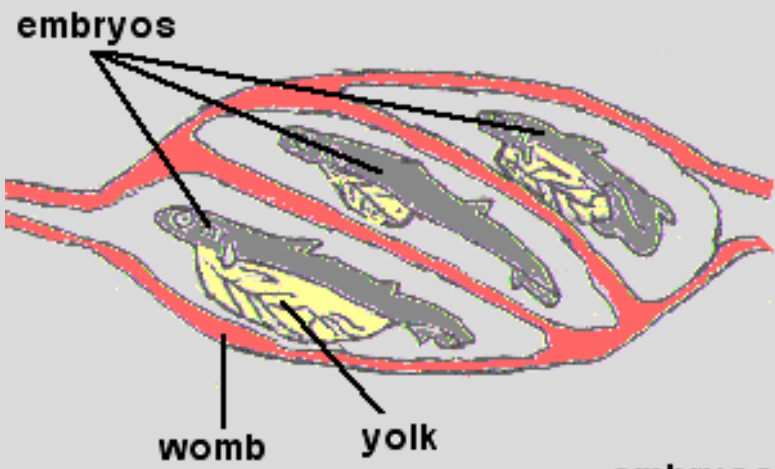
  - obligate - Lake Baikal sculpins,  
marine rockfishes (Scorpaenidae)

  - livebearers - Poeciliids, many sharks

    - gradient of nutrient supply from mother

    - superfetation

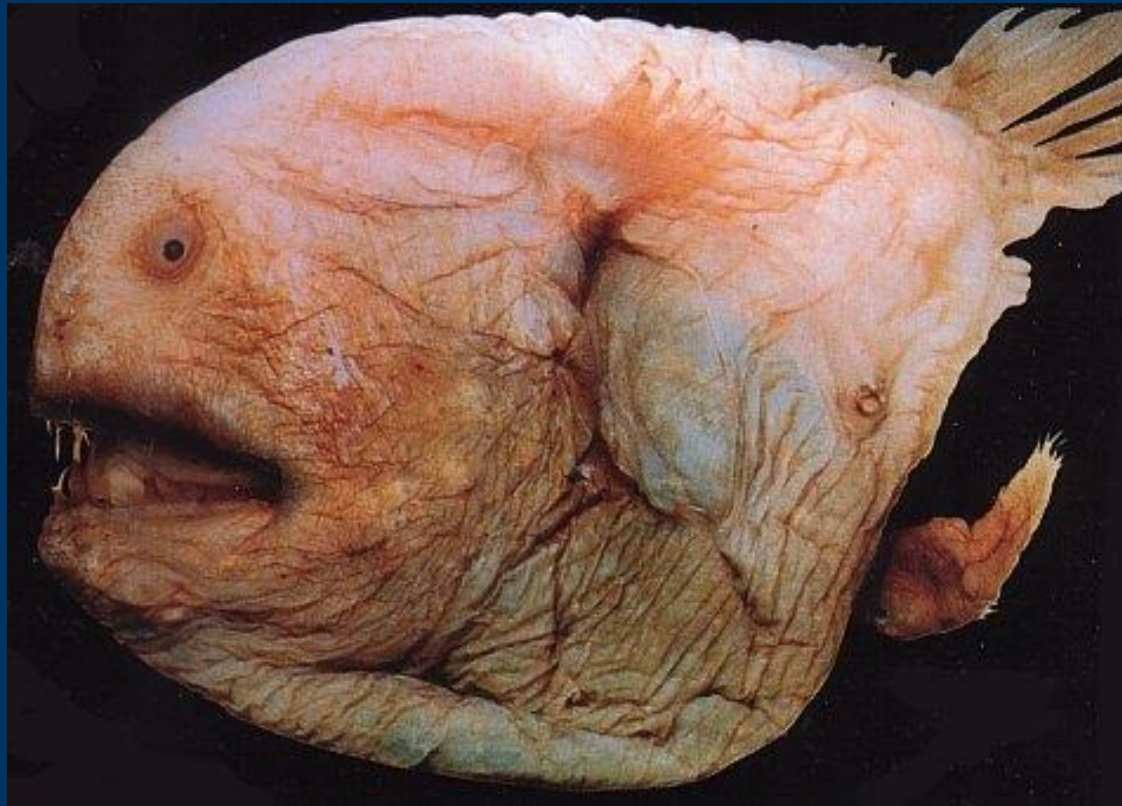
  - placental viviparity - sharks



# Reproductive strategies

the other extreme: minimal male investment

Lophiiformes: deepsea anglerfishes



# Alternative reproductive strategies

## Hermaphroditism

**synchronous** (or simultaneous) hermaphrodites

Myctophiformes: (lanternfishes) - several families

Atheriniformes: Aplocheilidae, Poeciliidae

Perciformes: Serranidae (sea basses, hamlets),  
Labridae (wrasses), and others

"Egg-trading" in black hamlets *Hypoplectrus nigricans* (serranid)



# Alternative reproductive strategies

## Hermaphroditism

consecutive (sequential) hermaphrodites

first male (protandrous) – less common

Stomiiformes (lightfish, dragonfish)

Scorpaeniformes: Platycephalidae

Perciformes: Serranidae, Labridae, and others



blue-headed wrasse

# Alternative reproductive strategies

## Hermaphroditism

consecutive (sequential) hermaphrodites

first male (protandrous) – less common

first female (protogynous)

Synbranchiformes (swamp eels – only freshwater example)

Perciformes: Serranidae, Maenidae, Labridae

from 100% female -> 100% male

from 100% female -> 50% male / 50% female

some do not pass thru a female stage ("primary males")

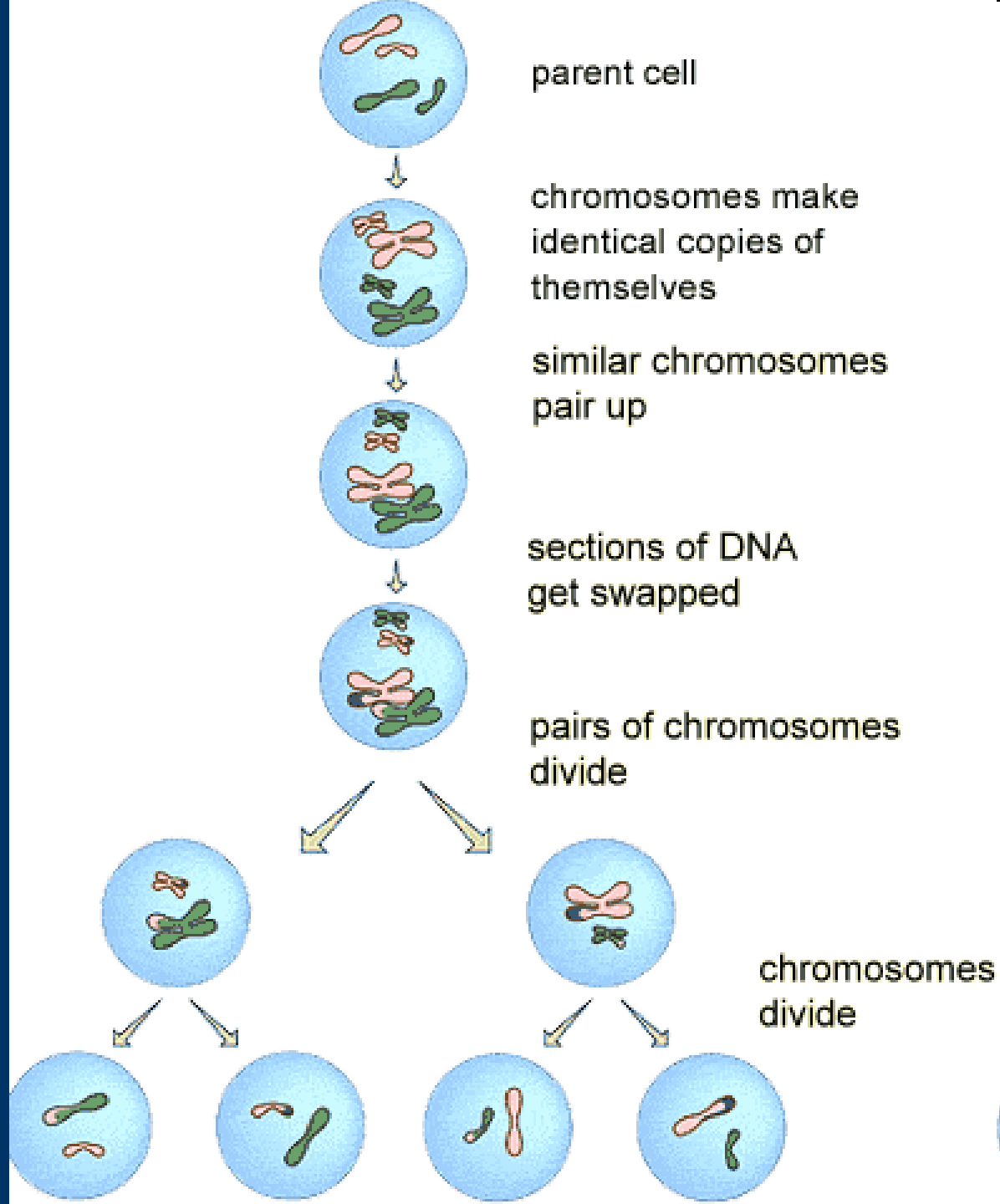


# Alternative reproductive strategies

## Unisexual species

processes of DNA re-assortment in sexual species:

1. crossing-over during first meiotic division
2. random segregation of chromosomes in second meiotic division
3. addition of male and female chromosomes after fertilization



# Alternative reproductive strategies

parthenogenesis:

females produce diploid eggs, no sperm used

premeiotic endomitosis - mitotic division without cytokinesis

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## gynogenesis:

females produce diploid eggs, use sperm to stimulate development

male genome not used

congeneric species are used for sperm

example: *Poecilia formosa* (Amazon molly)

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androgenesis – does not exist (why?)

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## hybridogenesis: one genome from female in egg,

male genome discarded - then uses sperm to restore ploidy

- no crossing over

example: *Poeciliopsis monacha-lucida*

# Alternative reproductive strategies

## Alternative male strategies

- jacks (salmon and trout)