

Co-evolution and Shell Morphology

What is co-evolution and What kind of evidence is used to support co-evolution?

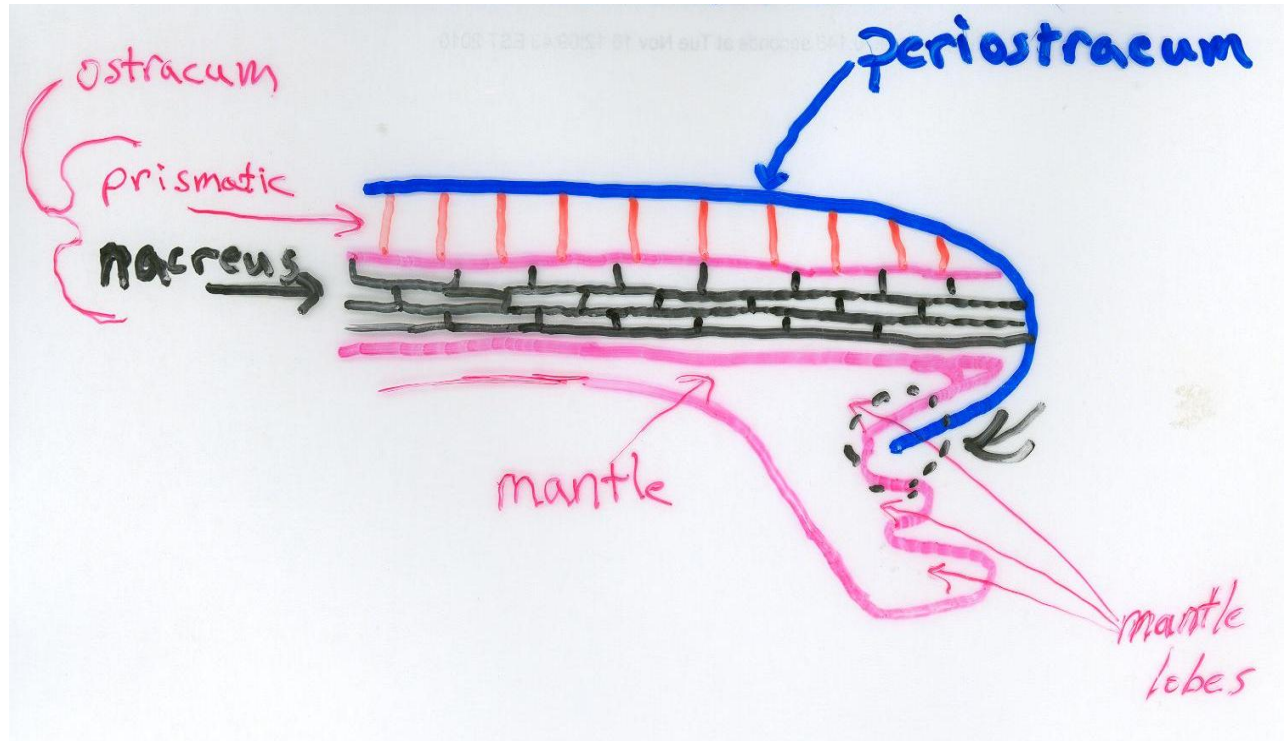
What are some examples? How has co-evolution led to diversification and subsequent speciation?

An Example: Predation and Counter-Defenses in Shelled Molluscs

Lecture Questions:

- How are shells built?
- How do they work / function?
- What role does predation play in their evolution (morphology)?

Shell Secretion and Morphology in Molluses



Shell Function

1. **Skeletal support for muscles**
2. **Protection from biotic and abiotic stressors**
3. **Offensive weapon**
4. **Aposomatic coloration**
5. **Thermal regulation**
6. **Dissipate energy**
7. **Boring**
8. **Reef formation**
9. **Stabilizing**
10. **Float**

Predation

1. **Evolutionary importance failure**
2. **Finding Victim**
3. **Pursuit**
4. **Capture and Subjugation**
 - **Methods**
5. **Shell Defenses**

Diversity of Predators on Shelled Molluscs

1. Chordata
2. Molusks
3. Arthropods
4. Protista
5. Cnidarian
6. Echinoderms
7. Platyhelminthes

Extraction Methods

1. boiling
2. crushing (externally / internally)
3. shredding
4. drilling
5. prying
6. swallowing whole
7. muscle abscission
8. dropping
9. stealth
10. Luck

Counter Defenses and impact on Diversity

- 1. Shell Thickening**
- 2. Spire shrinking**
- 3. Narrowing of Aperture**
- 4. Umbilica**
- 5. Behavioral**
- 6. Spines and ridges**
- 7. Slippery Soap**

Temperate vs. Tropic and Caribbean vs. Indo-Pacific Diversity