BIOINFORMATICS INTERNSHIP

Session eight

FUN FACT

SILK

- Silk fibers- protein based secretions, synthesized by arthropods
- Evolved ~23 times in insects
- Most arthropods make ONE silk type in their life with exception of spiders
- Economic intrest :
  - Mechanical properties
  - Toughness
  - Ability to absorb energy without breaking (force, light, heat)

SPIDER DIVERSITY

- ~43,000 diverse species, with ONE linking characteristic
- Synapomorphies uniting spiders include:
  - Presence of spinnerets and spigots
- Secretory glands have cells lining, that express genes encoding the silk proteins
- Proteins are secreted and stored in lumen of abdominal glands
  - Liquid silk leaves lumen to spigot and excreted forming a fiber
  - Silk proteins are very stable at high concentrations

SILK FUNCTIONAL DIVERSITY

- Araneiod orb weavers produce the widest diversity of silk:
  1. Major ampullate glands – dragline silk and the frame / radii
  2. Minor ampullate glands – constructing temporary capture spiral of orb web
  3. Flagelliform gland – used to make core fiber of webs capture spiral
  4. Aggregate gland – produce sticky droplets that coat capture spiral
  5. Tubuliform glands – female specific, used to make egg case fibers
  6. Aciniform glands – used as prey wrapping silk and construction of egg case
  7. Piriform glands – a cementing silk that secures fibers (dragline to substrate)

REVIEW

- Questions?
  - Vim
  - Functions
  - Modules

- Rosalind