

BIO 2135 - Animal Form and Function
Midterm examination
Worth either 10% or 15% of your final grade

Tuesday February 8, 2011

- a) Place your name and student number in the space provided below. Be sure that your name is on the top of each page because the exam will be separated to facilitate marking
- b) Circle the lab section for your lab.
- c) Check to be sure that your exam is complete with a total of 12 pages including this one
- d) Answer all questions in the space provided on the exam. Do not transfer answers to the back of the page
- e) The exam is out of 95 pts.

Name:

Student No:

Exams will be returned on the lab so please circle your lab section:

Thursday: A1-BSC312, A3-BSC330, A5-BSC335 A7-BSC310

Friday: A2-BSC312, A4-BSC330 A6-BSC335

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15 pts Part 1. Briefly explain what each of the following biological terms means. Where possible include an example in your definition from a group or an organism to which the term applies.

Statolith/Statocyst

Statolith {Balance/ gravity detection} {Inside statocyst} {Position of statolith provides the sensory information as it rolls around in statocysts}	Statocyst {Balance/ gravity detection} {Contains statolith} {Position of statolith provides the sensory information as it rolls around in statocysts}
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Cnidocil

{part of the cnidocyte/modified cilium – not the nematocyst because it is part of the cell not the organelle (Nematocyst that fires) or characteristic of the cnidaria} {Is the trigger that causes the cell to fire/discharge the nematocyst} {A statement about how only certain stimuli make it fire/organic material makes it fire for example}

Spiral cleavage

{Characteristic of the Spiralia (taxon name and not Protostomes)} {4 to 8 cell stage in the embryo} {divide through equator or a description that describes four cells on top and four underneath} {Cells twist/spiral relative to each other – cells on top sit in the grooves of the cells underneath} Must have first and either of the others for a total of three points

Pellicle

{in protozoans/ciliates but either will be fine in the answer} {reinforces the membrane/folded membrane/ microtubules interwoven in kinetodesmata – a description about how the reinforcing is done} {What it reinforces against – the forces generated by the cilium or the flagellum}

Porocyte

{asconoid sponge – must say asconoid no points for just sponge} {Water enters through it} {to the spongocoel – this to distinguish that the spongocoel is the destination of the water that travels through the porocyte}

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20 pts Part 2 Answer each of the following multiple choice questions by placing an X in the space to the left of the correct choice. There is only one correct answer for each question.

2.1 Where are the choanocytes in a syconoid sponge

- A: Spongocoel
- B: Incurrent canal
- C: Radial canal
- D: Choanocyte chambers
- E: None of the above

2.2 A cnidarian skeleton is

- A. Bony
- B. Cartilagenous
- C. Made of spicules
- D. made of ossicles
- E. hydrostatic

2.3 Name given to the stage in *Paramecium* conjugation when the two haploid micronuclei have fused to return to the diploid state.

- A: Synkaryon
- B: Prokaryon
- C: Mesokaryon
- D: Metakryon

2.4 This is the first type of cell that is attacked by the malaria parasite as it enters its human host.

- A: Red Blood Cell
- B: Liver Cell
- C: Stomach cells
- D: Salivary gland cell

2.5 The brain of a Cnidarian is best described as

- A: nonexistent
- B: enclosed in a protective cranium
- C: as only a dense mass of nervous tissue surrounding the mouth
- D: consisting of paired ganglia and paired nerve cord
- E: Both b and d are correct

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2.6 The thin flat cells covering the outer surface of sponge

- A. Choanocytes
- B. Pinacocytes
- C. Amebocytes
- D. Sclerocytes
- E. Archeocytes

2.7 The collar of a choanocyte

- A. Regulates the diameter of the osculum
- B. Filters food from the water
- C. Regulates the diameter of the ostia
- D. Secrete the digestive enzymes

2.8 A coelom is a body cavity lined with

- A. Mesenteries
- B. Epidermis
- C. Mesodermal tissue
- D. Ectodermal tissue
- E. Endoderm

2.9 In the ciliates this structure serves as the genetic reserve of the cell.

- A. Macronucleus
- B. Polyploid nucleus
- C. Triploid nucleus
- D. Micronucleus

2.10 In the Anthozoa these ciliated tracts circulate water through the gastrovascular cavity to maintain the hydrostatic skeleton.

- A. Siphonoglyphs
- B. Mesenteries
- C. Manubria
- D. Rhopalia
- E. Oral discs

2.11 The chills and fever of malaria are correlated with

- A. cycles of shizogony in the liver cells
- B. release of the sporozoites from the oocysts
- C. escape of merozoites from the red blood cells
- D. the formation of the gametocytes

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2.12 In protists, both gas exchange and excretion occur across the plasma membrane using

- A. Endocytosis
- B. Active transport
- C. Simple diffusion
- D. Exocytosis
- E. Pinocytosis

2.13 In Cnidarians intracellular digestion occurs

- A. in the gastrovascular cavity
- B. in the nutritive muscular cells of the gastrodermis
- C. in the mesohyl
- D. in the epithelio-muscular cells of the gastrodermis
- E. in the stomach

2.14 Correct sequence in a schyphozoan life cycle.

- A: Strobila, Ephyra, Schyphostome, Medusa, Planula.
- B: Strobila, Planula, Schyphostome, Medusa, Ephyra.
- C: Strobila, Planula, Schyphostome, Medusa, Ephyra.
- D: Strobila, Ephyra, Medusa, Planula, Schyphostome.
- E: None of the above.

2.15 Most ciliophoran (ciliate) protists

- A. have flagella
- B. have a cytostome
- C. are marine
- D. are mainly parasitic

2.16 The cavity of cnidarians that serves as a digestive chamber, and for exchange of gases and metabolic wastes.

- A: Intestine
- B: Spongocoel
- C: Gastrocoel
- D. Gastrovascular cavity
- E. Archenteron

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2.17 Eggs in sponges are commonly formed from

- A. Pinacocytes
- B. Porocytes
- C. Choanocytes
- D. Sclerocytes
- E. None of the above

2.18 The nematocyst is an organelle found in this type of Cnidarian cell.

- A. Cnidocyte
- B. Choanocyte
- C. Epitheliomuscular cell
- D. Nutritive muscular cell
- E. None of the above

2.19 This membranous shelf inside the bell margin of hydrozoans is important for locomotion and unique to the class.

- A. Statoblast
- B. Hydranth
- C. Coenosarc
- D. Velum
- E. Manubrium

2.20 In protists this form of reproduction involves the production of multiple nuclei by mitosis and after all the nuclei are produced cytoplasmic cell division separates each nucleus into a new cell.

- A. Binary fission
- B. Fragmentation
- C. Budding
- D. Conjugation
- E. Multiple fission

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20 pts Part 3: Complete the following sentences using the appropriate terms. Place the term in the space in the sentence or at the end of the sentence.

- 3.1 Euglenozoans use this/these for locomotion. Flagella
- 3.2 Embedded in the epidermis, these protect a free-living flatworm from predation. Rhabdites
- 3.3 Anthozoans are missing this stage of the typical cnidarian life cycle. Medusa
- 3.4 This is the structure that keeps a tapeworm anchored in the intestine. Scolex, hook sucker
- 3.5 The dual roles of cells lining the cnidarian gastrovascular is reflected in their name. Nutritive muscular
- 3.6 Instead of dorsal and ventral sides, cnidarians have oral and this surface. Aboral
- 3.7 The junction of the oviduct, the opening of the seminal receptacle, and where the egg is usually fertilized in a parasitic flatworm. Ootype
- 3.8 During the evolution of the different animal phyla, this tissue is found for the first time in all the Bilateria. Mesoderm
- 3.9 Flatworms are hermaphrodites; this is the more scientific term or synonym used to indicate this. Monoecious
- 3.10 This "cap" is found at the advancing edge of a pseudopod. Hyaline
- 3.11 These structures found on the sides of a free-living flatworm's head are chemosensory. Auricles
- 3.12 The nematocyst is this type of subcellular structure. Organelle
- 3.13 Sporogony increases the number of malarial parasites in this host. Mosquito/definitive
- 3.14 A flatworm's incomplete gut is missing this structure. Anus
- 3.15 Initially, the pH of the digestive fluid in the food vacuole is this. Acidic
- 3.16 These polyps in a hydrozoan colony are responsible for reproduction. Gonozooids
- 3.17 When comparing the length of undulipods flagella are Longer.
- 3.18 These delicate, minute anthozoans create a unique and highly productive marine environment. Corals
- 3.19 The common name for the phylum Platyhelminthes. Flatworm
- 3.20 In the deepest ocean depths, the shells of protists can only be made of this mineral. Silica

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10 pts Part 4: Indicate whether the following statements are True or False by placing a T for true and an F for False in the space next to the question.

- F** 4.1 Dyenin arms connect the out microtubular doublets to the central core of an undulipod.
- F** 4.2 The egg forms from the microgametocyte while in the blood of the infected human host
- T** 4.3 The outer layer of the tapeworm tegument is formed from syncytial epidermal cells
- T** 4.4 Nutrients for the eggs in Platyhelminthes are produced in the vitelline glands.
- F** 4.5 Each proglottid in a tapeworm can be considered an individual and the whole tapeworm a type of colony.
- T** 4.6 Freshwater sponges remove excess water from their cells using water expulsion vesicles.
- F** 4.7 The trochophore larva is an autapomorphy for the Platyzoa.
- F** 4.8 The syconoid architecture is the most common sponge body plan.
- T** 4.9 Spongin is made of protein that resembles collagen.
- T** 4.10 Choanocytes are located in the choanocyte chambers of the leuconoid type of sponge.

Part 5 of the exam starts on the next page

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30 pts Part 5: Answer 5 of the following 8 questions in the space provided each answer is worth 6 points. If you answer more than five only the first five will be counted.

5.1 Briefly describe what a schizocoel is and how it is formed.

{a type of body cavity} {one of the ways a body cavity forms in the mesoderm – must mention it formed in mesoderm} {Mesoderm cells form near the blastopore} {mesoderm first appears as a solid mass} {cavity forms when the mass splits} {Once used to/no longer used to define the protostome animals}

5.2 What are the different stages and their sequence in the fluke life cycle? Give the functional importance of three of them.

Point each (must have full explanation if all 6 names are there with no explanation then award three points, If functional significance without names than 3 points)

Adult- produces eggs

Miracidium – swims to snail

Sporocyst – larval amplification in snail by producing redia

Redia – larval amplification in snail produces cercaria

Cercaria – swims from snail to next host

Metacercaria – waits for definitive host is protected/encysted or a explanation that covers the idea

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5.3 Anthozoans such as *Metridium* (the sea anemones) have complete and incomplete septa; what are they and how do they differ from each other?

{Septa are extensions of the outer body wall into the gastrovascular cavity} {Incomplete have a free end suspended in the gastrovascular cavity} {Complete septa connect the outer body wall to the pharynx} {Incomplete septa have a cnidocytes on the free end} {Incomplete have gland cells on the free end} {Retractor muscle usually has a muscle that is absent in incomplete} point each

5.4 What is a rhopalium, what does it do and in what animals would you find it?

{Sensory structures in Cnidaria} {in medusa stage} two components {statocyst that detects balance/gravity} {eye that detects light level} For the additional two points {compare image ability between schyphozoa and cubozoa} {in schyphozoa margin and cubozoa bell surface}

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5.5 Who are the Protostomia and what are the autapomorphies that define the group, explain two of them.

Autapomorphies: {blastopore becomes the mouth} {paired ventral nerve chord – paired must be in the answer!} {apical brain} 3points

Blastopore explanation 2 points: {during gastrulation invagination of the blastula to form gastrula} {creates gut/archenteron and opening the blastopore will become mouth}

Paired Ventral nerve cord explanation only one point for elaboration of this one

Apical brain explanation { Brain sits on top of the pharynx/digestive system} {creates unique connections that go around the pharynx/esophagous to connec to ventral}

Any combination of explanations that gives a maximum of three points

Additonal point for naming all the taxa in the group, must be all of them

5.6 How is the nervous and sensory system organized in a free living flatworm like *Dugesia* (Planaria)

Sensory system: Two main structures {(pair of simple eyes/ocelli/eye spots/eye cups) (light detection without an image)} {(Auricles) are (chemosensitive/taste chemicals in the water)} { brain/cephalization at anterior end} {nerve cords along edges – create ladder like organization} {(1,1)}{(1,1)}. And other two points to bring it to six.

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5.7 What is the differences and similarities between mesohyl and mesoglea, give an example of an animal where you would find each?

{Mesoglea – Cnidaria} and {mesohyl sponge (Porifera)}, {similarity - gel like matrix between inner and outer cells of body}, {mesohyal sponges no tissues} {mesoglea between the cnidaria with tissues} {similarity - Both have ameboid cells wandering in the matrix}. Point each

5.8 Describe briefly how protozoans ingest their food.

{Phagocytosis} {cytostome in ciliates but must distinguish it is in the ciliates only} {engulph solid food}
{Pinocytosis} {Ingest dissolved nutrients in a liquid form}
{Intracellular process}
{both a food vacuole that fuses with a lysosome (may mention it forms phagosome)}
Any to a total of six points