

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

**Friday, February 5, 2016**

Please read and sign in the space provided to acknowledge these instructions:

- a) a) Cellular phones, unauthorized electronic devices or course notes (unless an open-book exam) are not allowed during this exam. Phones and devices must be turned off and put away in your bag. Do not keep them in your possession, such as in your pockets. If caught with such a device or document, the following may occur: you will be asked to leave immediately the exam, academic fraud allegations will be filed which may result in you obtaining a 0 (zero) for the exam.
- b) 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
- c) **Circle the lab section for your lab. This information is used to get the exam back to you.**
- d) Check to be sure that your exam is complete with a total of 13 pages including this one
- e) Answer all questions in the space provided on the exam. Do not transfer answers to the back of the page
- f) The exam is out of 85 pts.

Name: \_\_\_\_\_

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Circle your lab section:

Tue:      A1-BSC312,    A5-BSC330.

Wed:      A2-BSC312,    A6-BSC330

Thu:      A3-BSC312,    A7-BSC330

Fri:      A4 -BSC312,    A8-BSC330

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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.

Phagosome

{ Cellular organelle } { formed by endocytosis/engulfing food } { Contains food to be digested } { Involved in intracellular digestion } Common mistake is to describe what happens to it not what it is.

Opisthokonts

{ protozoans with single flagellum/flattened mitochondria cristae } { Flagellum located behind } { beat of the flagellum pushes the cell forward } { A type of unikont }

Cnidocil

{ part of the cnidocyte/modified cilium – not the nematocyst because it is part of the cell not the organelle (Nematocyst that fires) nor 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 }

Autoapomorphy

{ shared derived trait } { Defines a taxonomic group } { there are a variety of examples that are possible here }

Hydranth

{ Also called gastrozooid } { Type of cnidarian polyp/Stage in hydrozoan life cycle } { Found in cnidarian colonies } { Polyp responsible for feeding }

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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

2.1 Conjugation is a means of reproduction seen in

- A. Ciliates
- B. Amoebas
- C. The malaria parasite
- D. Flagellates

2.2 Leuconoid sponges have choanocytes only in or on

- A. Their pinacoderm
- B. Their ventral surface
- C. Radial canals
- D. Flagellated chambers
- E. Spongocoel

2.3 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

2.4 A cnidarian stage that uses cilia as a means of locomotion is:

- A. The polyp.
- B. The trochophore.
- C. The ephyra.
- D. The medusa.
- E. The planula.

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2.5 These parasitic flatworms are so highly adapted to parasitism they don't even have an intestine of their own

- A. Planarians
- B. Blood flukes
- C. Tapeworms
- D. Lung flukes
- E. Chinese liver flukes

2.6 All ciliates have a large \_\_\_\_\_ nucleus that controls the daily functions of the cell

- A. Diploid
- B. Polyploid
- C. Haploid
- D. Monoploid
- E. Heteroploids

2.7 When the malarial mosquito bites it injects this stage of malaria into the human host.

- A. Merozoite
- B. Sporozoite
- C. Trophozoite
- D. Microgametophyte
- E. Macrogametophyte

2.8 Members of this deadly class of Cnidarians are referred to as the box jellies

- A: Hydrozoa
- B. Cubozoa
- C. Anthozoa
- D. Scyphozoa
- E. Mesozoa

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2.9 These specialized cells in a flatworms osmoregulatory system or the driving force for filtration.

- A. Flame cells
- B. Nephrocytes
- C. Renette cells
- D. Renal cells
- E. Nephridiopores

2.10 In lophophorate this coelom extends into the tentacles

- A. Mesocoel
- B. Metacoel
- C. Axocoel
- D. Exocoel
- E. Endocoel

2.11 A bryozoan's statoblast is part of which functional system?

- A: Digestive
- B: Respiratory
- C: Reproductive
- D: Circulatory
- E: Nervous and sensory

2.12 By the time a tapeworm proglottid matures it is full of

- A: Undigested food
- B: Water expulsion vesicles
- C: Eggs
- D: Gametes

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2.13 Free living flatworms move over the substrate using muscles and these for locomotion

- A. Cilia
- B. Parapodia
- C. Pseudopodia
- D. Flagella
- E. Legs

2.14 Stage of a fluke life cycle that swims to either its vertebrate host or another vertebrate host where it encysts.

- A. Redia
- B. Cercaria
- C. Metacercaria
- D. Miracidium
- E. Sporocysts

2.15 Some free living flatworms protect themselves against predators using these cells from cnidarians they have fed on.

- A. Nematocysts
- B. Epitheliomuscular cells
- C. Cnidocytes
- D. Trichocysts
- E. Gland cells

2.16 The \_\_\_\_\_ is the secreted body wall of a bryozoan, together with its secreted exoskeleton.

- A. Adhesive sac
- B. Statoblast
- C. Cystid
- D. Polypide
- E. Zoecium

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2.17 This part of the bryozoan digestive tract is connected to the pharynx.

- A. Intestine
- B. Cecum
- C. Cardiac stomach
- D. Cecum
- E. Pyloric stomach

2.18 Chemoreceptors that aid in the location of food are especially dense on these planarian structures.

- A. Eye spots
- B. Cerebral ganglia
- C. Statocysts
- D. Ocelli
- E. Auricles

2.19 The mesodermally derived tissue of flatworms includes this loose tissue that fills the spaces between other more specialized tissues and organs and the body wall.

- A. Mesohyl
- B. Mesoglea
- C. Vacuolated tissue
- D. Perenchyma
- E. Fibrous connective tissue

2.20 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

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**26 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 Bryozoans get their common name from these plants, which they look

like.     **Moss**    

3.2 Animals with radial symmetry often show this type of life style.

    **Sessile/Sedentary/Stationary**    

3.3 The coelom that forms inside a bubble of mesodermal cells that pinch off from the gut wall is called this type of coelom.     **Enterocoel**    

3.4 Name of the material found between the inner and the outer cell layers in a sponge.     **Mesohyl**    

3.5 This stage follows the miracidium in the fluke life cycle.     **Sporocyst**    

3.6 In the scyphozoan life cycle, once the planula settles it turns into this.     **Scyphostoma**    

3.7 In addition to the nutritive cord that connects colony members of a bryozoan colony, these also facilitate the exchange of materials.     **Pores**    

3.8 A bryozoan colony grows using this type of reproduction.     **Asexual/budding**    

3.9 These cells secrete digestive enzymes into the digestive cavity of a cnidarian.     **Gland**    

3.10 Endoderm cells appear at the start of gastrulation and form this new epithelial layer.     **digestive/nutritive/endoderm**    

3.11 The final pH as digestion ends inside a protozoan phagolysosome.     **High/Alkaline/Basic**    

3.12 Although it's not currently considered a deuterostome characteristic, the process of coelom formation has traditionally be associated with the taxon.     **Enterocoely**    

3.13 This cavity is lined with choanocytes in asconoid sponges but they're missing in the same cavity of a syconoid sponge.     **Spongocoel**    

3.14 Nerve cells form from this tissue layer.     **Ectoderm**

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- 3.15 In a scyphozoan, the ancestral polyp of the phylum is found in this stage of the life cycle.     **Schyphostoma**
- 3.16 The side of the body where you'll find the nerve cord in a worm.     **Ventral**
- 3.17 This vital epithelial cellular organelle lies below the basement membrane of the tapeworm tegument.     **Nucleus**
- 3.18 In this cnidarian class, the medusa and polyp are equally important in the life cycle.     **Hydrozoa**
- 3.19 The protein constituent of sponge spicules.     **Spongin**
- 3.20 The segments, or reproductive subunits, of a tapeworm.     **Proglottid**
- 3.21 Planaria feeds by using this extensible structure to get food into its digestive tract.     **Pharynx**
- 3.22 The cord of tissues transports nutrients between members of a bryozoan colony.     **Funiculus**
- 3.23 This term describes the multiple fission after fusion of gametes in the malaria life cycle.     **Sporogony**
- 3.24 Because flatworms lack a true body cavity they are referred to as being this type of an animal.     **Acoelomate**
- 3.25 The part of a bryozoan that includes the lophophore and retractable parts of the body.     **Polyipid**
- 3.26 These cells fill the dormant, overwintering sponge structure.     **Amoebocytes**

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**Part 4 of the exam starts on the next page**

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**24 pts Part 4:** Answer 4 of the following 8 questions in the space provided. Each is worth 6 points. Do an extra question as a bonus and you could raise your marks by up to 6 points depending on how well you answer the extra fifth question.

4.1 What is a dual gland adhesive system; name a phylum of animals with one and how it used.

What it is: There are two glands {Contains secretory/gland cells the secrete the glue that sticks the flatworm in place} {Secretions from the second gland release the glue and “unstick” the organism}

{Platyhelminthes}

Used for movement: {when glued in place the circular muscles contract increasing length pushing head forward} {Head sticks and the adhesive point behind releases} {Longitudinal muscles contract and the posterior is pulled forward towards the head}

4.2 Explain the cytoplasmic changes that occur at the hyaline cap of an advancing pseudopod.

{Endoplasm is converted to ectoplasm} {as actin monomers polymerize} {this polymerization stiffens cytoplasm makes it ectoplasm} {Myosin motors attach to actin filaments} {Motors also attached to cytoskeleton} {Myosin motor contractions squeezes endoplasm forward}

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4.3 Platyhelminthes were once considered to be at the base of the protostome lineage. This is no longer the case. Use three traits that were considered primitive to explain the new interpretation of the phylum's phylogeny of animals.

Any three of these:

- {incomplete gut - lack of the anus was thought to be similar to cnidaria}
- {incomplete cephalization - Mouth remained on the ventral surface and not directed forward}
- {Ladder like nervous system - Nerve cords hadn't fused along midline as in other groups}
- {acoelomate – coelomate condition hadn't arisen in the group}
- {eye spots – thought to come before camera eye}

Explanation:

- {These seemingly simple structures are derived not primitive}
- {Evolved from a complex coelomate animal/simplification of a previously complex organism}
- {The simplified its systems when it became flat – lost complexity as it simplified systems for a flat existence}

4.4 How is the body wall of a cnidarian polyp organized and how is this related to the way they move?

Uses {hydrostatic skeleton} {fluid of the hydrostatic skeleton is the gastrovascular cavity/gut and its contents} {apposing muscles are circular} and {longitudinal, two must both be there, no part marks for mentioning only one} {Circular are nutritive muscle cells with long being epitheliomuscular cells, two must both be there, no part marks for mentioning only one} {An indication how the shape of the polyp changes: Contraction of circular lengthens the polyp making it thinner, contraction of longitudinal shortens and makes it wider – not all this may be there}

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4.5 Briefly describe what a metachronal wave is, which organisms use it and what is its advantage?

{Describes the beating of the cilia on the surface}{in ciliates/ciliated organisms/Ciliophora – not *Paramecium* since the question asks “Which organisms”}{Power stroke and recovery stroke in different plane/angle to each other}{Beat of the cilia on the surface is not synchronous}{Asynchronous so that there is a mix of cilia at different stages of the beat (power and recover stroke) – a clear indication that the answer explains the nature of the asynchrony}  
{Smooth, precise movements with constant directed movement – no moving a bit backwards after moving forward}

4.6 Free living flatworms are often described as being preadapted for parasitism. Explain what preadaptation means and explain why this applies to these animals.

Preadaption is {when existing structures or morphologies can be used for new and different function}

Any three of these first two two points last one point}2,2,1:

{suckers}{dual gland system allows them to glue themselves in place inside their host}

{hooks} {epidermis secretes structure (rhabdites) and these have become the hooks and suckers}

{Flattened body}{Means that as a parasite they can cling to walls of internal organs with causing blockage}

{Flexible body plan} {Allows for modifications of body and also loss of systems that may not be required}

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4.7 Where do sperm and eggs come from in sponges and how do the two find each other in order to create the zygote?

{Sperm comes from choanocytes} {eggs usually come from amoebocytes} {eggs can also come from choanocytes} {Sperm is released into water leaving sponge and pulled into another sponge} {Sperm trapped by choanocytes} {Amoebocytes carry sperm to egg for fertilization and production of the zygote}

4.8 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 scyphozoa and cubozoa} {in scyphozoa margin and cubozoa bell surface}