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

Friday, February 8, 2013

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. This information is used to get the exam back to you

c) Check to be sure that your exam is complete with a total of 13 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 90 pts.

Name:_____

Student No:_____

Circle your lab section:

Tue: A1-BSC312, A5-BSC330.

Wed: A2-BSC312, A6-BSC330

Thu: A3-BSC312, A7-BSC330

Fri: A4-BSC312, A8-BSC330

•

Name:..... Student Number: .....

21 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.

Blastopore

{During gastrulation/development of the embryo}{Outer epithelium invaginates} {opening to the pocket cavity that forms from the invagination is the blastopore}
Many students will try and take this further and talk about protsotmes and deuterostomes – this is not needed here

Parazoa
{cellular grade of organization/no cell to cell communication}{No tissues are present} {example Porifera/sponges}

Autapomorphy

{A type of shared derives character/synapomorphy}{that defines a taxonomic group/taxon}{There are lots of examples possible here – when marking refer to the cladograms of the animals or Cnidaria that were used in class}

Epitheliomuscular cell
{Special cells that define/autapomorphy of Cnidaria}. Have two components {Contractile elements/ myonemes}{epithelial – tissue covering that creates the outer cell layer of the body}

Paraphyletic

{A taxon/group of related organisms – taxon implies they are related if don't use it it must be clear that the organism are related to each other – share a phylogeny – evolutionary history} {includes the ancestor to the group but not all the descendents} {Birds were paraphyletic to the other reptiles}

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}

Synkaryon

{During conjugation in Ciliates/Paramecium}{After exchange of nuclear material between two separate organisms}{Contains only the diploid complement of genetic material}{There is no macronucleus}

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 Starting with the first in the list which is the correct sequence for the fluke life cycle (not all of the stages may be in the list – just be sure that they are in the right order)

_____A. Metacercaria, redia, Sporocysts, Adult, Cercaria

_____B. Cercaria, Adult, redia, Metacercaria, egg

__**X**__C. Metacercaria, Egg, Miricidium, Redia, Cercaria

_____D. Redia, Egg, Cercaria, Adult, Sporocyst.

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

_____A. Digestive

_____B. Respiratory

__**X**__C. Reproductive

_____D. Circulatory

_____E. Nervous and sensory

2.3 The simple light detective structures in free living flatwormss are called

___**X**___A. Eye spots

_____B. Auricles

_____C. Statocyts

_____D. Chemoreceptors

_____E. Phasmids

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

_____A: Hydrozoa

___**X**___B. Cubozoa

_____C. Anthozoa

_____D. Scyphozoa

_____E. Mesozoa

2.5 Which of the following is not a function of a nematocyst

_____A. Defense

_____B. Locomotion **Locomotion is when hydra uses them to stick to the substrate and sommersau**

___**X**___C. Trapping prey by filtration

_____D. Paralyzing prey before it is swallowed

_____E. Paralyzing prey after it is swallowed

2.6 Structures found in tapeworms but not in any of the other flatworms are:

_____A. proglottids

_____B. scolex

_____C. strobilla

___**X**___D. All of the above

2.7 This type of sponge architecture has oscula but no spongocoel

_____A. Asconoid

___**X**___B. Leuconoid

_____C. Syconoid

_____D. Asteroid

2.8 A free living flatworm's mouth is located on the _____ surface of the animal.

_____A: oral

___X___B: ventral

_____C: aboral

_____D: dorsa

2.9 The first larval stage in the life history of a fluke is the

_____A. Redia

___X___B. Miracidium

_____C. Cercaria

_____D. Sporocyst

_____E. Oncomiracidium

2.10 By the time a tapeworm prolottid matures and is fully gravid it is full of

_____A. Undigested food

_____B. Water expulsion vesicles

___X___C. Eggs

_____D. Gametes

2.11 Syconoid sponges have choanocytes only in or on

_____A. Their pinacoderm

_____B. Their ventral surface

___X___C. Radial canals

_____D. Flagellated chamgers

_____E. Spongocoel

2.12 This structure allows for the transfer of nutrients between zooids in hydrozoan colonies.

___X___A. Coanosrac

_____B. Perisarc.

_____C. Funiculus.

_____D. Digestive ceacum

_____E. None of the above.

2.13 In free living flatworms, when rod like contents of these cells swell and hydrate they form a protective, distatesful mucous covering for the body

_____A. Endocytes

_____B. Mucocytes

_____C. Ectocytes

__X__D. Rhabdites

_____E. Flame cells

2.14 This opening at the top of a sponge is found in all three architectures.

__X__A. Osculum

_____B. Atriopore

_____C. Ostia

_____D. Mouth

_____E. Anus

2.15 Excretion and gas exchange in sponges are accomplished by

_____A. Active transport

__X__B. Simple diffusion

_____C. Contractile vacuoles

_____D. Nephridia

_____E. Osmosis

2.16 Organisms in the Supergroup Amoebozoa use these (this) for locomation.

_____A. Cilia

__X__B. Pseudopodia

_____C. Hydrostatic skeleton

_____D. Flagella

_____E. None of the above

Name:..... Student Number: .....

2.17 The thin flat cells covering the outer surface of sponge

_____A. Choanocytes

__X__B. Pinacocytes

_____C. Amebocytes

_____D. Sclerocytes

_____E. Archeocytes

2.18 In diploblastic organisms the two embryonic layers are:

_____A. Mesoderm and endoderm

_____B. Mesoderm and mesoglea

_____C. Ectoderm and mesoderm

_____D. Mesoglea and blastoderm

__X__E. Ectoderm and endoderm

2.19 This part of the aquiferous system is lined with choanocytes in asconoid sponges but missing these cells in the syconoid form.

_____A. incurrent canal

_____B. radial canals.

_____C. flagellated chambers.

__X__D. spongocoel.

_____E. excurrent canal.

2.20 Sponge gemmules contain masses of:

__X__A; Archeocytes

_____B. Porocytes

_____C. Choanocytes

_____D. Sclerocytes

_____E. Calcium carbonate cells

Name:..... Student Number: .....

25 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 Embedded in the epidermis, these protect a free-living flatworm from predation. **Rhabdite**

3.2 In the deepest ocean depths, the shells of amoebas can only be made of this. **Silica**

3.3 This dormant sponge structure helps a freshwater sponge get through the winter. **Gemmule**

3.4 Microtubular molecular motors can be distinguished from each other by their movement relative to this structure. **Centriole**

3.5 Myosin motors travel along strands of this protein. **Actin**

3.6 When comparing the length of undulipods flagella are **Longer**.

3.7 In this Cnidarian class you'll never find any sign of a polyp. **Cubozoa**

3.8 These delicate minute anthozoans create a unique marine environment. **Corals**

3.9 The first flagellum was used for this process. **Feeding**

3.10 Most species of flatworms have this type of life cycle. **Parasitic**

3.11 Describes the cycle of larval amplifications by the malarial parasite inside the human host. **Shizogony**

3.12 When the malarial mosquito bites it injects this stage of malaria into the human host. **Sporozoite**

3.13 These cells secrete digestive enzymes into the digestive cavity of a cnidarian. **Gland Only these secrete**

3.14 Conjugation is a unique way of mixing **Genetic** material of two different ciliates.

3.15 Another name for the water expulsion vesicle is a **Contractile** vacuole.

3.16 Instead of dorsal and ventral sides, cnidarians have oral and this surface. **Aboral**

3.17 The ancestral motile eukaryote had this number flagella. **One**

3.18 Single cilia often fuse to form larger structures collectively called this type of ciliature. **Compound (is the generic name and cirrus is one type)**

3.19 Most of a flatworm's body mass is made of this tissue which fills the space between the epidermis and digestive tract. **Parenchyma/Mesoderm**

3.20 This is the first type of cell attacked by the malaria parasite when it first enters the human host. **Liver**

3.21 Type of molecular motor used in amoebozoan cytoplasmic streaming. **Myosin**

3.22 These pull a bryozoan's tentacles back inside its casing (Two words). **Retractor muscles**

3.23 The protein constituent of sponge spicules. **Spongin**

3.24 The water pumping system in a sponge is also called this type of a system. **Aquiferous**

3.25In large colonial protists the only division of labour seen in the cells is associated with the production of these specialized cells. **Gametes/Sex cells**

PART 4 Starts on the next page

Name:..... Student Number: .....

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 fifth question.

4.1 Complete the following table by adding the missing taxon with the unique autoapomorphy or by providing one example of an autoapomorphy for the taxon.

Taxon	Autoapomorphic character
Cnidaria	Cnidocytes
Cnidaria	Planula larva
Bilateria	Single axis of symmetry between the oral and aboral surfaces.
Hydrozoa	**One of: Medusa from lateral buds, velum, or dimorphic life cycle with medusa and polyp.**
Animalia	Ingestive, multicellar heterotrophs
Platyhelminthes	**One of: Incomplete gut, Multiciliated epidesmis, or Hermaphrodite reproductive sytem**
Porifera	**One of: Totipotent cells, aquiferous system, or assymetric bodty plan**

4.2 Describe the structure and growth of a bryozoan colony and its individual members.

Must have these 5: {Starts from one founding individual – ancestrula}{grows by budding/asexual reproduction}Each zooid/polyp individual consists of {polypide – the part of the bryozoan that includes the lophophore}{cystid – includes the tissues that secrete the shell and the organ systems inside}{Colony members connected by funiculus}

Additional point can come from: {Zoecium is the non-living outer part of the shell} {In freshwater species statoblast is used to survive the winter}{colony is called a zooarium}

4.3 What is a protonephridium, what does it do and how does it do it?

{Find them – Platyhelimthes/Platyzoa/flatworm}{osmoregulatory and may also include excretory}{Filters fluid between the cells/parenchyma – interstitial fluid}{Cilia in flame cell push fluid down tube}{Creates negative pressure that draws fluid across cell membrane}{because across membrane it is selective/semipermeable} – parts of the answer may be in the form of a diagram

4.4 What is the dual gland adhesive system and how does planaria, a free-living flatworm, use it to move.

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

Movement: {when glued in place the circular muscles contract}{This contraction increases length pushing head forward}{Head sticks and the adhesive point behind releases}{Longitudinal muscles contract and the posterior is pulled forward towards the head}
OR if muscles aren't mentione:
{Head moves forward and sticks}{back releases and is pulled towards head}

4.5 The terms symplesiomorphy and synapomorphy can often refer to the same character or trait. Use the phylogeny of the Cnidaria to explain why this is. (NOTE: This question is NOT asking for the phylogeny of the Cnidaria!)

{Symplesiomorphy = Shared ancestral trair}{synapomorpgy = shared derived trait} {All Cnidaria as a phylum/taxon share the synapomorphies}{(any one or all of these may be listed: Cnidocytes, Planula, epitheliomuscular cells, and polyp body plan} {At the next taxonomic level of classes in the phylum all inherit this trait in their phylogeny}{ Because the traits are in the evolutionary past of the different classes they become Symplesiomorphies for the classes}.

(A planula larva is an innovation for all the Cnidaria (a synapomorphy) but for the Hydrozoa they share the trait with the other classes making this a symplesiomorphy.)

4.6 Use the cnidarian polyp and medusa to explain what a hydrostatic skeleton is and how it works in these two cnidarian morphologies.

{Concept that role of the skeleton is to work with antagonistic muscles – stretches contracted muscle back to original lengh etc.} {In a hydrostatic skeleton the muscles work against water/fluid to meet the skeletal}

Polyp movements {Circular muscles around diameter/Longitudinal muscles run the length}{Fluid cavity is the gastrovascular cavity/digestive tract – there may be other ways that this will be explained that we must watch for}

Medusa movements {Only circular muscle presents}{Mesoglea is the hydrostatic element and compresses when circular contract and elasticity stretches back – it must be clear in the answer that the gutis not a part of this hydrostatic skeleton}

4.7 Today, how are protostomes differentiated from deuterostomes? How has the distinction changed over the last 20 years?

Now: Protostomes are differentiated by blastopore becoming the mouth (protostome) or anus (deuterostome)

In the past: {Protostome traits included: schizocoely and spiral cleavage} and {deuterstome traits included enterocoely and radial cleavage} Must have the pairs correct to get the point. {For each all three were have thought to have occurred together, were monophyletic, grouped when the two lineages separated from each other}

{Enterocoely is not monophyletic and is now found in both the protostome and deuterostome lineages}
{Spiral cleavage is not found in the ecdysozoa – part of the protostome lineage}
{Shizoceoly is not at the base of the protostome lineage but in the Trochozoa (Lophotrochozoa lineage}

One point if it is only stated that: {These other traits are not located at the split between protostomes and deuterostomes in the current phylogeny}

4.8 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 *Parameciem* 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}