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

Friday, March 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 14 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

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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.

Trochophore

{larval stage}{of part of the lophotrochozoan/of the trochozoans}{includes Annelids and Molluscs – must mention two phyla}{larva with a ciliated band around the mouth – or a drawing that indicated what it looks like.

Tagma

{Arthropods}{Where segments have been fused to form functional regions} {An example: Head fusion of segments for sensory or food acquisition / or thorax for locomotion / trunk where all segments have legs}

Saccate metanephridium

{Ciliated funnel of metanephridiacovered with membrane}{semi permeable membrane} {filters haemolymph/fluid in hemocoel/ultrafi}{ex. Arthropods-an example of one from coxal glands, maxillary gland antennal gland} to a maximum of three

Haemocoel
{Main blood / body cavity of animals} with {an open circulatory system} {ex. Mollusca or Arthropoda

Triradiate pharynx

{Found in nematode}{formed from Epitheliomuscular cells} {Triangular sections of muscle} {Optimal organization to quickly open the pharynx and pull in food} any to a maximum of three points

Renette cell

{nematodes}{assumed to be excretory and/or osmoregulatory organ} {function is not really clear}{Forms the laterial line/a part of the lateral line}

Beta-Chitin

{consists of chains of chitin made from N-acetyl-glucosamine}{Chitin molecules arranged in parallel directions}{ionic interactions hold the chitin molecules together} {not as strong as alpha chitin where there are more ionic interactions that make it stronger}

22 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 The open, ciliated funnel of a metanephridium is called the

_____a. infundibulum.

_____b. chloragogen.

___**X**___c. nephrostome.

_____d. nephridiopore.

_____ e. flame bulb.

2.2 The digestive enzymes in a clam are released from:

_____a. the crystalline style

_____b. the lining of the stomach

___**X**___c. the digestive gland

_____d. the intestine

_____e. the ctenidia

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2.3 The outer layer of the arthropod exoskeleton called the _____ is made of a waxy lipoprotein, which makes it impermeable to water.

_____a. procuticle

_____b. mesocuticle

___X___c. epicuticle

_____d. endocuticle

_____e. sclerocuticle

2.4 The endocuticle and exocuticle combine to form this in Arthropods.

_____a. epicuticle

_____b. basement membrane

_____c. prismatic layer

___X___d. procuticle

_____e. cuticle

2.5 The outer most layer of a nematode body is:

_____a. ciliated epidermis

___X___b. a noncellular cuticle

_____c. a cellular cuticle

_____d. a syncytial tegument

_____e. a nonciliated epidermis

2.6 The 180 degrees, counter clockwise twisting of the visceral mass, mantle, and mantle cavity of gastropods is called

_____a. contortion.

___X___b. torsion.

_____c. helixing.

_____d. coiling.

_____e. operculating.

2.7 In nematodes the copulatory spicules function to:

_____a. attract the female.

_____b. deliver sperm to the female vagina or gonopore.

____**X**___c. hold the female gonopore open against hydrostatic pressure.

_____d. store sperm in the male until copulation occurs.

_____e. store sperm in the female after copulation.

2.8 Pigment cells of cephalopods are called

_____a. pinacocytes.

_____b. odontophores.

____**X**___c. chromatophores.

_____d. erythrocytes.

_____e. nautilophores.

2.9 The individual receptors of the compound eyes of an insect are called

____**X**___a. ommatidia.

_____b. ocelli.

_____c. eyespots.

_____d. statocysts.

_____e. photophores.

2.10 Best describes muscle organization in a nematode

_____a. layers of longitudinal and circular muscle

____**X**___b. bands of longitudinal muscle

_____c. a single layer of circular muscle

____**X**___d. a single layer of longitudinal muscle

_____e. none of the above

2.11 You will always find these in earthworms, but they may only be present in marine worms, *Nereis* for example, at certain times of the year.

_____a. Setae

_____b. Metanephridia

___**X**___c. Gonads

_____d. Clitellum

_____e. Eyes

2.12 The inner layer of the mollusc shell is the layer.

_____a. radular

_____b. prismatic

___**X**___c. nacreous

_____d. helix

_____e. periostracum

2.13 The body of molluscs is divided into two main regions called

___**X**___a. head-foot and visceral mass.

_____b. mantle and foot.

_____c. head-foot and enterocoel.

_____d. visceral mass and mantle.

_____e. head and foot.

2.14 Sperm packets of cephalopods are called

_____a. hectocotyli.

_____b. stylets.

_____c. cocoons.

___**X**___d. spermatophores.

_____e. gonophores.

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2.15 The circulatory system of cephalopods (squids and octopods for example) is more efficient than that of other molluscs because:

_____a. Cilia no longer move water over the surface of the gill

_____b. it is a closed network of vessels.

_____c. all blood is circulated through the gill filaments.

_____d. accessory or brachial hearts increase blood pressure before it flows through the gills.

X

_____e. All of the above are correct.

2.16 The circulatory system of polychaetes is

_____a.bloodless.

____**X**___b. closed.

_____c. lacunar.

_____d. open.

_____e. countercurrent.

2.17 External respiratory exchange in most annelids is accomplished by

_____a. ventilation.

_____b. active transport.

_____c. endocytosis.

_____d. facilitated diffusion.

____**X**___e. simple diffusion.

2.18 The material that flows through the pneustome of a terrestrial snail is:

_____a. Undigested food from the alimentary tract

_____b. Water leaving the mantle cavity

____**X**___c. Air

_____d. Water flowing into the mantle cavity

_____e. Food in a strung of mucous

2.19 In gastropods, food is trapped in mucus and incorporated into a rotating mass called the

_____a. stylet.

_____b. siphonoglyph.

__X__c. crystalline style.

_____d. odontophore.

_____e. osphradium

2.20 The ventral lobe of a parapodia is called the

_____a. aciculum

_____b. notopodium

__X__c. neuropodium

_____d. cirrus

_____e. ctendidium

2.21 *Ascaris*, our example of a nematode in the lab, is unusually large because;

_____a. its subphylum was one of the ancestral lineages of the phylum

__X__b. it has adapted to an internal parasitic existence

_____c. because it is dioecious

_____d. of the unique arrangement of the muscles

_____e. None of the above

2.22 Because their shells are made of it, land snails are limited to soils that contain some level of:

_____a. aluminum.

__X__b. silica.

_____c. calcium.

_____d. sodium.

_____e. carbon.

2.23 The main body cavity of a crustacean

_____a. Pseudocoel

_____b. Mesocoel

_____c. Hemocoel

__X__d. Pseudocoel

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23 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 What paired structure is found inside the pharynx of the Nereid worm. **Jaws**

3.2 Describes the separation of the old cuticle from the epidermis. **Apolysis**

3.3 A nematode has this number of ovaries. **Two/paired**

3.4 The chlorogogue (chlorogogen) tissue is involved in this type metabolism. **Nitrogen/deamination**

3.5 The model describing arthropod vision. **Mosaic/Visual mosaic**

3.6 When the circular muscles in an earthworm segment contract the segment does this. **Lengthens/elongagtes**

3.7 In a pseudocoelomate this tissue layer doesn't completely line the body cavity. **Mesoderm**

3.8 In squids the gills are no longer covered in cilia now that these are used to pump water in and out of the mantle cavity. **Muscles/mantle**

3.9 The curl on the posterior end of a nematode identifies its gender as this. **Male**

3.10 Animals in the phylum Nematoda are commonly called this type of worm. **Roundworms**

3.11 The nerve cord is on this side of an annelid. **Ventral**

3.12 This muscular structure helps a nematode swallow its food. **Pharynx**

3.13 Parapodia are involved in locomotion and this function **Respiration/gas exchange**

3.14 Can molting fluid digest the exocuticle? **No**

3.15 Of the four major groups of arthropoda, these are extinct. **Trilobites**

3.16 The time between arthropod molts. **Instar**

3.17 All that remains of the mollusc shell in a squid is a short rod referred to as this. **Pen**

3.18 The grinding action of this structure helps to release digestive enzymes into a clam's stomach. **Gastric shield/crystalline style**

3.19 Free-swimming marine worms are referred to as being this. **Errant**

3.20 Marine worms don't have these permanent organs; instead, they develop only during the reproductive season. **Gonads/ovary/testes**

3.21 Secretions from this gland act as decoy allowing cephalopods to make their escape. **Ink**

3.22 Once the food has been sorted in a mollusc, it passes into this gland to be biochemically broken down. **Digestive**

3.23 As a result of torsion, snails have this kind of symmetry. **None/assymetric**

PART 4 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 question.

4.1 Briefly explain how the insect compound eye forms an image.

{basic function unit is the ommatidium} {Sensory retinular cells detect light and create nerve impulse}{Surrounded by pigment cells, optically isolate each ommatidia} {detected by microvilli/rhabdom a part of the sensory cells}{different sensory cells that detect different colours of light}{results in a single dot of light – they will refer to it as a pixel like a computer and various dots integrated together to form image/called the visual mosaic model}

4.2 Describe how a freshwater brozoan colony is started and how it grows.

The subject for this question should have been on the exam. So you could just ignore it or if you knew the answer go ahead and answer it.

{Statoblast from previous year}{statobalst resistant/ protected from cold}{single brozoan from the statoblast is first}{first is called the ancestrula}{Asexual reproduction or budding grows the colony}{all the individuals are identical}

4.3 How are the muscles arranged in an earthworm and the marine polychaete and how does this affect the way that they move?

Marine polychaete:

{Long muscle in bands, very little circular}{Contracts on opposite sides sides by bands of longitudinal creating S-shaped – both parts must be here for the point}{Parapodial oblique muscle lifts parapod/create pivot}

Earthworm

{Long and circular muscles both involved} {When longitudinal contract segment expands and setae anchors in place}{Explanation of how movement occurs relative to the anchor point – in front longitudinal contract to push head forward, behind long contract to pull posterior forward}

4.4 Why is only the old cuticle and not the new procuticle digested during moulting in arthropods?

{digesting enzymes that will digest the old cuticle are secreted into space in an inactive form} {first layer of epicuticle (cuticulin) laid down} {This cuticulin/first layer is semi permeable} {Chitinase and Proteinase, must have both for the point} {enzymes activated} {Enzymes to digest the cuticle on outside of cuticulin and because of position only old cuticle is available for digestion}

4.5 Describe how the digestive tract of the squid has been modified to suite the food it eats?

{Normal structure has a radula with a straight tube with a digestive gland off to the side} {In addition to the radula the mouth includes a chitinous beak} {allows tear and rip food into pieces}Digestive gland modified {one part forms the liver which secretes digestive enzyms}{This part also has a pancreas that produces enzymes} {second part becomes the cecum for absorbing nutrients} {Stomach becomes site of digestion}

4.6 Briefly describe the events when earthworm mates and produce young.

{Male and females orient with ventral side against each other}{Held in place by secretions of the clitellum} {Sperm passes from seminal vesicle to seminal receptacle of the other}Later/after they separate{Eggs are fertilized} {clitellum makes a mucous sleeve and fertilized eggs are placed inside}{cocoon contains nutrients from the clitellum}{Mucous sleeve slides of a and dries to form a cocoon that protects the fertilized egg}{Small miniature worm develops inside the cocoon} Point each to a maximum of 6

4.7 How do arthropods detect mechanical and chemical stimuli?

{Setal hairs in sockets are embedded in the cuticle}

For mechanoreception: {Nerve attaches to setal hair}{Movement of the setal hair triggers a nerve impulse}

For chemoreception: {Setal hair has small holes}{The nerve is located by small holes to detect chemicals}{Lots of holes smell only one hole taste – must have both these parts for the point}

4.8 Describe how blood flows in the circulatory system of an earthworm .

Two main types of vessels [longitudinal {dorsal to the front} {posterior to the back}] [{lateral connect dorsal and ventral}, {pass through metanephridia, body wall and gut – at least two of these for the point – no part marks}], [{all but five lateral flow from ventral to dorsal}, {aortic arches/hearts flow provide high quality blood to gonads}]