Examples of Preparation and Consolidation Time

Example #1: Family History: Principles of Human Genetics
Bev Hay

Collection of a detailed family history is a key ingredient in clinical genetics practice. We do this to gather information to assess risk for inheritable conditions, but the same tool can be used for more complex medical conditions (e.g. heart disease). Each year since 2004, the Surgeon General has declared Thanksgiving to be National Family History Day. The thought is that families are most likely to be gathered in one place on that day, and by bringing awareness of familial traits to the table, we can better assess health risks.

The purpose of this task is to use an on-line tool to compile your own family history. In order to allow you to answer the questions honestly, we will not collect the assignment so that you can maintain your privacy. However, you may wish to keep a record of this exercise so that you can use it in your own medical care in the future. This web-based tool can also be shared with other family members.

For consistency, the following website will be used: http://www.hhs.gov/familyhistory/
An alternative site is http://nsgc.org/p/cm/ld/fid=52
It should only take about 15 to 20 minutes to build a basic family health history.
Please email Beverly Hay with any questions.

Example # 2: Reading: Principles of Human Genetics
Bev Hay

Department of Health and Human Services (HHS)
"GINA"
The Genetic Information Nondiscrimination Act of 2008
Information for Researchers and Health Care Professionals

April 6, 2009

Example #3: Exploring Your Cultural Heritage – Doctoring and Clinical Skills

HOMEWORK FOR SEPTEMBER 30th SESSION
Please complete the following questions in time to discuss them in your DCS1 small groups on Thursday, September 30, 2010. This is an exercise to promote self-awareness. You will have an opportunity to share your answers to questions #1 and #2 with one other member of your small group.

Exploring Your Cultural Heritage
Culture: a group with commonly shared experiences or values. Includes, but is not limited to: age, gender, race, ethnicity, religion and spirituality, literacy/language, economics/social class, sexual orientation, and profession.

1. Thinking about the definition of culture described above, describe your own culture.
2. Describe a "defining moment" when you became aware that you were different or had the experience of feeling "other".
3. How did your family and cultural group address health and illness when you were growing up? For example, were your parents quick to keep you out of school? Was serious illness in a family member discussed openly or kept secret? How has that changed?
4. What are the advantages/disadvantages of your cultural heritage when you are interacting with people from other cultures?

5. In which of the following settings have you had experiences with people of other cultures?
__ family of origin
__ neighborhood as a child
__ elementary school
__ middle school
__ high school
__ college
__ work experience
__ current friends/clubs/activities
__ current neighborhood
__ religious affiliations
6. How do (did) your family view different cultures? Did your parents, grandparents or other family display any hatred or bigotry toward a particular ethnic or racial group? Did they accept people who are gay, lesbian, bisexual or transgendered? How has that affected you?
7. What characteristics of a person make it possible for them to relate to people from other cultures?
8. How has your childhood heritage helped/hindered development of these characteristics?
9. Were there any people from a particular culture you were uncomfortable interacting with when you were growing up? How about today?

Example 4: Reading Prep for Lecture on Cell, Tissue and Membrane Structure: BWCT: Roger Craig

Dr. Roger Craig
August 13, 2010

BASIC STRUCTURAL ORGANIZATION OF CELLS AND TISSUES; THE STRUCTURE OF CELL MEMBRANES
This handout is to be read in preparation for the lecture on cell, tissue and membrane structure on August 16th.

The reading below is suggested if you want to delve deeper.
Suggested Reading: Ross, Histology (5th ed.), pp. 3-20 (methodology), pp. 23-31 (cell and membrane structure), pp. 92-97 (general organization of tissues)

Useful Supplementary Alberts, Essential Cell Biology (2nd ed.), pp. 5-11 (methodology); Reading: pp. 365-386 (membrane structure).

I. Objectives
1. Know the four basic tissue types, and their relationship to each other in a typical organ
2. Understand the general principles of operation of the light and electron microscopes, their limits of resolution, and how specimens are prepared (fixation, sectioning, staining etc) for observation
3. Recognize and understand the plane of section problem
4. Name, recognize and know the structural organization and functions of all the major components of a cell (organelles, inclusions etc)
5. Name and know the functions of the 3 major chemical constituents of cell membranes
6. Know how these constituents appear in the light and electron microscope and how they are organized at the molecular level
7. Know how each determines the physical and chemical properties of the membrane, and thus determine how it functions
8. Know the several modes of association of proteins and carbohydrates with cell membranes

II. Techniques in histology and cell biology
Histology (or *microscopic anatomy)* is concerned with the microscopic structure of the cells, tissues and organs of the body, and how this relates to their function. The main structural techniques used to study histology and cell biology are light and electron microscopy. To appreciate and interpret fully the structures that you observe in light and electron micrographs and in histological slides viewed in the lab, it is necessary to have a basic understanding of the procedures used in specimen preparation. These are described in the introductory section of the Lab Manual, which you will read in your Prep Time for the first lab of the course. Craig-BWCT-2010 2

OPTIONAL STUDY QUESTIONS
These optional questions should stimulate your thinking about the material presented and reinforce some of the concepts.

1. You can envision a hepatocyte (liver cell) as a cube measuring approximately 15 m on each edge.
a. There are approximately 10_{10} ATP molecules in a hepatocyte. Estimate the concentration of ATP (in mM).
b. What is the approximate surface area of a hepatocyte?
c. There are approximately 20,000 receptors on the surface of an isolated hepatocyte that are specific for binding the hormone insulin. If these receptors are equally spaced on the surface, what is the average distance between them?
d. Assume you have a fluorescent antibody that binds to the receptor, and that you are using a fluorescence microscope with a resolution of 200 nm (0.2 m). Would the individual receptors be distinguishable from each other, assuming that one receptor would be visible?

2. The red blood cell (erythrocyte) is a biconcave disk, 7 m in diameter. It is often used as an internal "scale marker" with which the sizes of other cells and structures can be compared. Would you expect a red blood cell to be resolvable in the light microscope? Would you be able to resolve the structure of its plasma membrane, or would you need the electron microscope? What technique would you use to observe the arrangement of integral membrane proteins in its plasma membrane?

3. From a functional point of view, why should all proteins of a membrane have the same orientation with respect to the bilayer? In a similar way, lipid molecules stay in one leaflet of the bilayer or another, flip-flopping between layers being extremely rare. What prevents it?

Example # 7: Brain: Nervous System and Behaviors
Sue Gagliardi

Prep/Consolidation Session: Spinal Cord Basics Due Monday 8/15/11

The purpose of this session is preparation for the 8/15 lecture in which we will first examine some myelin- and cell-stained spinal cord images for review, but then focus primarily on the descending motor pathways.

Assignment

Learn the basic structure of the spinal cord gray and white matter and how to identify its major segmental levels by studying the Spinal Cord Basics Workbook and doing the brief quiz on p. 14. Some of this material is also covered in the brief Course Book section, *General Anatomy of the Spinal Cord* (PDF 42-43).

Objectives
At the conclusion of your prep work you should be able to close your study materials and:

1. Compare and contrast the specific cellular components found in gray matter and white matter.
2. Name the major gray matter and white matter structures common to all spinal cord segments.
3. List the gray matter specializations that are unique to the lumbosacral and cervical enlargements, and to the thoracic and upper lumbar segments of the spinal cord.
4. Make a quick sketch of a transverse spinal cord section in the cervical enlargement showing the shape of the entire cord, and of its gray matter. Draw in and label the following structures: posterior columns, dorsal horn and ventral horn gray matter, substantia gelatinosa, tract of Lissauer, anterior white commissure.

Example # 8: Brain: Nervous System and Behaviors
Sue Gagliardi

Prep/Consolidation Session: SC Structures, Pathways, Clinical Due Friday 8/19
The purpose of this session is consolidation of information on Spinal Cord Structure, Pathways, and Clinical Applications and preparation for the 8/19 Clinical Conference, the Case of the Bartender.

We have discussed the structure of the spinal cord, the three most clinically important long tracts found in the spinal cord (corticospinal tract, posterior column-medial lemniscus pathway and the spinothalamic pathways) as well as pathways that convey spinal information to the cerebellum. We have also described some key signs and symptoms that indicate damage to these pathways.

Now it's time to put this information together and to start using it to localize spinal cord damage.

Assignment
Use one or more of the following to study anatomical and clinical information on the spinal cord:

- Course Book (sections on spinal cord) and/or your own class notes
- BRAIN Spinal Cord Atlas A

Some of you may find this next resource helpful for localizing lesions (or not...)

- Spinal Cord *Clinical Problem Solving* (PDF p. 81) –1 page summary

Prior to taking the upcoming graded assessment on the spinal cord, we recommend that you assess your knowledge by doing this self-test – do it when you feel ready.

- Course Book *SC Study Questions* (PDF pp. 85-88; Answers on pp. 346-349)

Objectives:

At the conclusion of your prep work, you should be *on your way to achieving* the following objectives:
1. Draw a cross-section of the spinal cord in the cervical enlargement, and indicate the location of major gray matter and white matter structures (including the 3 major long tracts and the dorsal spinocerebellar tract).

2. For each of the 3 major long tracts, describe its anatomy (including point of crossing), functions, and signs/symptoms of damage in the spinal cord.

3. Explain why lower motor neurons signs/symptoms are helpful in localizing a lesion along the length of the spinal cord

4. Use motor and sensory findings of key spinal cord syndromes to localize the following lesions:

- A complete (or nearly complete) transverse lesion
- A lesion that damages the spinal cord on one side only (initially think of a complete lesion involving all structures on say the L side of the spinal cord)
- A small central lesion of the spinal cord in the area of the central canal
- A lesion caused by compression on one side of the cord from the outside
- A lesion that involves the posterior part of the spinal cord (sparing lateral and anterior structures)