BIO130 Library Assignment Worksheet

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/23

	Review Article	Primary Research Article
1. Citation: Use the CSE style to cite your peer-reviewed review and primary research articles (4 marks: 1 mark for each appropriate article and 1 mark for each accurate citation). **Review Article: Provide a link in the table so your TA could retrieve the article in the box together with the citation.** **Primary Research Article: Provide the citation here in the table, but also upload a PDF of the article to Quercus.**	https://www.sciencedirect.com/science/article/pii/S0014482713004205 Guérout N, Li X, Barnabé-Heider F. 2014. Cell fate control in the developing central nervous system. Experimental cell research. 321(1): 77-83.	https://dev.biologists.org/content/140/7/1594 Yu K, McGlynn S, Matise MP. 2013. Floor plate-derived sonic hedgehog regulates glial and ependymal cell fates in the developing spinal cord. Development. 140(7):1594-1604.

2. Compare and contrast the features of each chosen article by listing 3 points specific to each article showing why they are “primary” or “review”. (6 marks)	1. The topic is very broad, which talks about cell fate control in the overall central nervous system (the spinal cord and cerebral cortex). 2. The format is a traditional format of a review paper. It doesn’t have materials or methods section and it contains only one graph to summarize all the information the authors give. 3. This paper does not present original experimental results. It only summarizes, integrates and interprets the results of other research papers of related areas. For example, in the neuron section, the author told us that progenitor cells are located in the ventricular zone according to one research paper’s result and Shh is produced by two sources according to another research paper’s result.	1. The topic is very focused, which talks about how a specific secreted morphogen sonic hedgehog regulates glial and ependymal cell fates in the developing spinal cord. 2. The format of this article shows that it is a primary paper, which contains title, author, abstract, introduction, materials and methods, results, discussion and references. Also, it contains many graphs to explain its results. 3. This paper presents its original experimental results. For example, it finds that notochord regression is complete prior to gliogenesis in the spinal cord.
	Review Article	**Primary Research Article**
3. (a) How many figures does each of your articles have? (1 mark)	**1**	**7**
3. (b) Choose one figure from each article and briefly describe what the figure shows (1 mark for each article). Then, suggest why the authors might have chosen to include it (1 mark for each article). Think about how the figure supports the authors’ goals for	**Fig 1 on page 81** It is the only figure in the paper and a summary of the research results of the entire paper. It provides a schematic representation of the generation of neural cell types in the spinal cord and the cerebral cortex. (Part A is about cell types in the spinal cord. Par B is about cell types in the cerebral cortex). The authors include this figure to give their readers an integrated sense of how the spatial-temporal regulation works. It is important because the authors introduce different neural cell types by parts. They first introduce the generation of neurons, and then astrocytes, followed by other neural cell types. Since	**Fig 1 on page 1596** It is chosen to include here to support the first and second result of this paper: notochord regression takes place during neurogenesis and is complete prior to the onset of gliogenesis at spinal cord levels. A show the process of notochord moving from ventral neural tube between 26~42 somite stages in the mouse embyo. B depicts the process with a transverse view. C-J show selective conditional deletion of Shh(FP) to determine the requirement of Shh(FP) for neurogenesis and gliogenesis. First, authors chose to include this figure is to help them show the whole idea of the

each article. Clearly indicate the figure or table number, and the page on which it appears. If either of your articles has no figures, suggest why this might be the case. (4 marks total)	the generation information is separated and is all explained by words, it is difficult for readers to imagine how the whole system actually works. The figure can provide a vivid sense of the whole process and integrate all the separated information together. Therefore, it is wise for the authors to choose to include this figure and provide detailed explanation below the figure.	first and second result in a clearer way. Readers can understand the result better with this vivid figure. Second, the figure can work as an evidence to help authors to prove the correctness of the result, making the argument more convincing to readers.
	Primary Article Only	
4. When determining which experiments to conduct, the authors of a **primary** research article must first determine their ***research question***. (a) What is the research question for your **primary** research article? (2 marks) (b) What *other* research questions could the authors have addressed? Suggest two. *Hints:* For example, is there another approach to framing the research question for your primary research article?	The secreted morphogen sonic hedgehog(shh) plays an important role in cell fate specification in the central nervous system. Shh is derived from two different sources, which are notochord and floor plate. Notochord only underlies the neutral tube during neurogenesis but not gliogenesis. The authors try to investigate whether Shh(FP) has a more specific or significant role during later stages of neural tube development, while gliogenesis and the terminal differentiation of multiple cell types are occurring, and how Shh(FP) regulates glial and ependymal cell fates in mice. Other research questions: 1. The authors can also investigate the role of sonic hedgehog produced by notochord in the central nervous system. How sonic hedgehog(notochord) regulates central nervous system during neurogenesis? The different functions of hedgehog(notochord) and hedgehog(shh) during the early stages of neural tube development. 2. How other morphogens regulates the later stages of neural tube development, while gliogenesis and the terminal differentiation of multiple cell types are occurring, such as fibroblast growth factors (FGFs) and retinoic acid (RA)>	

Or, are there any other gaps in the scientific community's knowledge of the topic? (1 mark for each suggestion, 2 marks total)	
	Primary Article Only

5. A **primary** research article presents a collection of experimental data which will usually support *or* contradict the authors' hypothesis and will answer or partly answer their research question. (*Hint*: You can find a summary of this information in the abstract and introduction). (a) For your primary research article, did the results support or contradict the authors' research question/ hypothesis? (1 mark) (a) Explain (3 marks)	The result of the primary research article supports the authors' research question that Shh(FP) has important roles during later stages of neural tube development. First, the authors prove that Shh(Noto) does not influence spinal cord cell fates after E12.5. Then, the authors prove that if Shh(FP) is removed, the later stages of neural tube development gets affected. Therefore, they get to the conclusion that Shh(FP) is involved in the later stages of neural tube development. Several specific aspects of later stages of neural tube development are investigated. First, Shh(FP) is required for oligodendrocyte specification and maturation beginning at E10.5, the time period that notochord regression is taking place. The authors find that Shh(FP) is required for normal oligodendrocyte specification by repressing the formation of Gli3-R in OL progenitor cells. Thus, olig2 expression is switched to OLs during gliogenesis, and the Nkx2.2-expressing p3 domain which is located more ventrally, which is adjacent to FP. It means that Shh(FP) is responsible for oligodendrocyte specification and maturation Second, Shh(FP) can influence astrocytes. The authors argue that Shh(FP) transduction factors Gli1 and Gli2 are expressed with S100 in E15.5 and E18.5. Thus, Shh(FP) might regulate S100 expression. The research evidence shows that the loss of S100 in the absence of Hh signaling will reactive astrogliosis. However, the expression of astrocyte progenitor markers are not significantly altered in Shh(FP) or Smo embros, which means that astrocyte specification do not necessarily need Shh(FP), although the speed of the production of astrocyte is reduced. Therefore, Shh(SF) can influence signaling to astrocytes in both embryos and adults, but in a very complex way. Besides, a surprising finding in the study shows that ependymal zone cell formation would be largely disrupted in mice lacking Hh signaling. All in all, Shh(FP) indeed is important and indispensable during later stages of neural tube development.

If you do not remember from BIO120H how to use the library resources or how to determine whether your journal article is peer-reviewed, please see the library guide created for BIO120H at http://guides.library.utoronto.ca/bio120

Modified from an earlier document created for BIO241 (Dr. Melody Neumann, Dr. David Dansereau and Heather Cunningham).