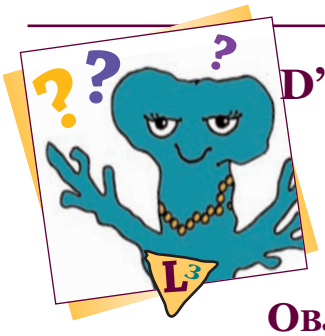

D'Scerner: Critical Appraisal of a Review Article on the Role of Dopamine in Addiction

Teacher Section for Parts 1, 2, and 3

Objectives:

Using instructional materials in the activity, students will be able to:

Module 1 Thinking About the Study

- Find sources of potential bias in the study and describe how they might affect the results in Part 1, 2, and/or 3
- Identify the type of study design in Part 1
- Indentify independent, dependent, and controlled variables in the study in Part 1 and/or 2

Module 2 The Results

- Create graphs (Part 1) and scatter plots (Part 2) from data presented in data tables
- Create a line of best fit on a scatter plot (Part 2)
- Determine trends in a scatter plot (Part 2)
- Use the best type of graph to represent data
- Use data presented in Venn Diagrams
- Explain the importance of "surprise" findings (Part 1 and/or 2)

Module 3 Analyzing the Results

- Use a written guide to systematically analyze the study results to determine their meaning (Part 1, 2 and/or 3)
- Explain why it was important to disclose a limitation in the study (Part 3)
- Explain how technology has helped reveal the biology of addiction (Part 2)

Module 4 Comparing and Contrasting

- Compare and contrast the journal report to the media report to determine accuracy of the media report in Part 1, 2 and/or 3
- Complete a Venn Diagram that compares the journal and media reports in Part 1, 2, and/or 3

Activity Description:

How often do we hear *"Research Says"* …? To develop science literacy skills, students need to ask *"Does it Really…"*. Using a peer-reviewed journal article that has been transformed for age appropriateness, students will analyze a peer-reviewed review article about drug addiction research. They will compare the results reported in the journal article to a media article that reported the results of the same study groups. Student analysis is carefully directed in a systematic way through the use of four student

modules. The modules created for each critical appraisal lesson are very similar in structure to help students develop scientific "habits of mind" as they work through the lessons. This lesson is based on many studies done to analyze the importance of dopamine in the biology of addiction. The study is divided into three parts to help students process the information. Students will learn about the importance of review articles in fast-paced areas of science. Each of the three parts can be done as a stand-alone lesson or they can be done together. The review was funded by the National Institute on Drug Abuse.

Materials:

- 1 class set of the Journal Article *The Role of Dopamine in Addiction Part 1, 2, and/or 3*
- 1 class set of the Media Article *Dopamine and Addiction*
- 1 copy of the *Student Modules* (Parts 1, 2, and/or 3) per student

(***Note:*** If copy numbers are limited, you can make a class set of the modules and have students record their answers in a journal or on their own paper)

Management Suggestions:

The lesson can be divided into separate modules; each can be done at different times of the year to align with the scope and sequence.

Suggested Modifications:

Allow students to work in pairs and provide modules with some information prefilled for students in need of such assistance.

Suggested Extensions:

Students can research other important functions of dopamine.

References Used:

Hill, AB. (1965). The environment and disease: Association or causation? *Proceedings of the Royal Society of Medicine*, 58, 295-300.

Last, JM. (2000). A Dictionary of Epidemiology. USA: Oxford University Press.

Volkow, N., et al. (2002). Role of Dopamine, the Frontal Cortex and Memory Circuits in Drug Addiction:Insight from Imaging Studies. *Neurobiology of Learning and Memory* 78, 610-624.

Wingert, P. (2006). Dopamine and Addiction. *Newsweek*, accessed online at http://www.newsweek.com/id/44295/output/print on Dec. 2, 2009.

Activity "Administrivia"

Intended Grade Level: 6–8

Key Concepts:

Critical appraisal skills, compare/contrast, analyzing results of a study, study design, variables, controlled variables, neurotransmitters, PET Scans, drug abuse, dopamine, brain reward system, addiction

Process Skills Utilized in Lesson:

Communication, inference, prediction, analysis of data, graphing

Previous Learning Assumed:

Basic scientific process skills, graphing skills, sources of bias

Relevant TEKS

6, 7, and 8 Grade Science

6, 7, 8.2 Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to:

(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns;

(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

6, 7, 8.3 Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;

6, 7, and 8 Grade Health

6.4 Health information. The student comprehends ways of researching, accessing, and analyzing health information. The student is expected to:

(A) list ways to evaluate health products, practices, and services such as sunblocks, dietary aides, and over-the-counter medications; and

(B) use critical thinking to research and evaluate health information.

6.5 Health behaviors. The student engages in behaviors that reduce health risks throughout the life span. The student is expected to:

(C) describe chemical dependency and addiction to tobacco, alcohol, and other drugs and substances;

6.10 Personal/interpersonal skills. The student describes healthy ways to communicate consideration and respect for self, family, friends, and others. The student is expected to:

(G) identify stressors and their impact on the health of the individual and family.

7-8.4 Health information. The student knows how to research, access, analyze, and use health information. The student is expected to:

(A) use critical thinking to analyze and use health information such as interpreting media messages;

(B) develop evaluation criteria for health information;

7-8.5 Health behaviors. The student engages in behaviors that reduce health risks throughout the life span. The student is expected to:

(H) explain the impact of chemical dependency and addiction to tobacco, alcohol, drugs and other substances;

(I) relate medicine and other drug use to communicable disease, prenatal health, health problems in later life, and other adverse consequences;

Key Words for Web Page: Critical appraisal skills, compare/contrast, analyzing results of a study, study design, variables, controlled variables, graphing, neurotransmitters, PET Scans, drug abuse, dopamine, brain reward system, addiction