Historically Speaking: The Historical Perspective Activity Suggestion Activity 1B

Note:

This activity suggestion describes how specific content might be taught to middle school students. It does not contain fully developed lesson materials, which we hope to develop under future funding in this content area. Any feedback on how you are able to use this lesson suggestion would be greatly appreciated. Your comments can be sent to us at teachhealthk-12@uthscsa.edu.

Activity Focus:

Cardiocritters: Animal Models in CV Research

Cardiovascular disease is the leading cause of death in America today. Cutting edge researchers rely on using ideal animal models that mimic the human subject closely but are large enough to permit physiological studies that will develop into end-stage cardiovascular disease comparable to those found in humans. The considerable advances and progress made so far would not have been possible without the use of animal models. So far, there is no one species that is suitable for studying the very complex cardiovascular disease, however the smaller mammals are better suited than larger mammals due to cost. The most common animal models include small rodents, mice, and rats because larger mammals are more costly and not as compatible to humans. Students will focus their attention on conducting research on the history of using animal models in cardiovascular disease. They will investigate the historical progression of cardiovascular disease and track the improvements made in the diagnosis of the disease and new therapies found. They will also discuss new and improved cardiovascular drugs, new devices discovered and improved procedures used throughout history. This important research will lead students in making their own educated judgments about the importance and necessity of using animal models for the advancement of biomedical research, especially in the fight against cardiovascular disease.

Activity Rationale:

Animal models have a long and successful history in the discovery of cardiovascular drugs. It is clear from the historical record that animal models

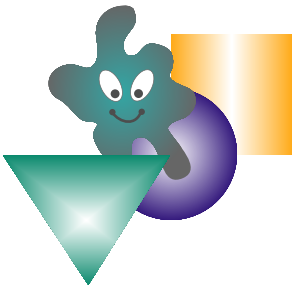
in research have been central to the development of modern medicine, both for understanding normal anatomy and physiology and for developing diagnoses and therapies. Without animal models, many diseases would still be plaguing the human race. In some cases, including subtle and long-term effects of drugs or therapies, there is no alternative to using animal models. Scientists must continue to improve the techniques used in caring for experimental animals used in research.

It is true that other methods such as mathematical models, computer simulations, and cell cultures (*in vitro*) have contributed greatly and lend themselves readily to the understanding of the cardiovascular system and the discovery of new drugs. It is no longer practical to design drugs for human and veterinary use without the aid of sophisticated computer modeling and computer graphics. Although these sophisticated models enhance science, they will not take the place of animal research and testing. In the case of cardiovascular diseases, including atherosclerosis, acute myocardial infarction, and stroke which are very complex, using mathematical models are not accurate enough and cannot be interpreted reliably for application to the human body. Such models are not able to predict reliably the long-term effects of biological responses to new devices or procedures used in humans. These biological responses require long-term animal models for evaluation.

There are legitimate sensitivity issues surrounding the usage of animal models in research. Researchers usually cite these reasons for continuing animal research: 1) humans are mammals, 2) the development of the disease and its response to therapy in animal models is often similar to those found in humans, 3) animal models provide standardized and federally-mandated methods for testing the safety and efficacy of new drugs before they are released for human clinical trials, and 4) animal models offer reliable testing for complex prostheses or interventions in which the collective response of the whole system is important.

Researchers believe that progress depends critically upon the continued use of animal models. Models are a necessary tool for biomedical research, for the progress of human and veterinary medicine and the maintenance of human and animal health. There is no branch of life science or medicine in which the current knowledge base is not determined in some way by the results of research using animal models.

Although the number of animals needed for research may not increase, neither are they likely to decrease. Animal models in cardiovascular research will provide, in even greater abundance during the decades to come, new insights, new opportunities undreamed of, for the alleviation of human suffering caused by disease.



Activity Suggestion, continued

Suggested Methodology:

Due to sensitivity issues related to research using animal models, the teacher will obtain written permission from the parents giving their child permission to participate in conducting research into the history of animal model research. Prior to the activity, the teacher will use brainstorming and previewing activities such as **KWL**, **Prediction guides**, etc. to motivate student discussion surrounding the ethical and moral issues related to animal model research. Students will draw a card about a specific historical event involving animal models that enhanced or improved cardiovascular disease.

In order to guide the Internet research, the teacher will create a web-based investigation site where the students will access a hot links page with appropriate URL's. Students will choose websites previously viewed by the teacher that show why animal models are necessary for the advancement of biomedical research, particularly in cardiovascular disease.

Activity Resources:

http://cardiovascres.oxfordjournals.org/cgi/content/full/39/1/60