MISMR
Michigan Society for Medical Research

BioFocus

A Newsletter Exploring Science & Biomedical Research Issues For School Educators

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Our Mission

The Michigan Society for Medical Research (MISMR) is a nonprofit educational organization that supports biomedical research and testing and the judicious use of animals in research, education and testing in the interests of human and animal welfare. Established in 1981, MISMR is made up of the state's leading research universities, teaching hospitals, pharmaceutical companies, voluntary health organizations and hundreds of scientists, educators and students who understand and support the importance of animal research and testing in advancing health care and treatment.

MISMR Educational Projects & Activities

ANNUAL ESSAY CONTEST

Every year MISMR sponsors an essay contest open to all Michigan high school students. Students from well over 500 schools in the state have annually participated in the contest to address the benefits of biomedical research. Prizes are awarded.

SPEAKERS BUREAU

MISMR volunteers visit K–12 schools and civic community groups through out Michigan each year to educate the public about biomedical research and to dispel commonly held myths.

ANNUAL SYMPOSIUM

MISMR's popular annual meetings have often proved to be "standing room only", typically attracting local and national educators and researchers with interactive training workshops and presentations promoting biomedical research.

WE WANT TO HEAR FROM YOU!

We want to include your stories, comments or questions relating to animals in your classroom in upcoming editions of *BioFocus.* Please email stories to: mismr@umich.edu

BioFocus

BioFocus is published by the Michigan Society for Medical Research. Please send your questions, comments, and suggestions to:

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The Big "C"

James W. Crissman, DVM, PhD, DACVP

Cancer, the big "C", neoplasia, and tumors: all words that are scary stuff for us mortals. People often talk about finding "a cure for cancer." Unfortunately, while all cancers have certain features in common, cancer can arise in any tissue in the body, and so is not a single disease, but a very diverse and complex family of diseases with individual causes and treatments. Cancer can be defined as unregulated cell growth forming masses (tumors) or life-threatening increases in circulating blood cells (leukemias).

Wikpedia

Cigarette smoke is a carcinogen.

Agents that cause cancer are called carcinogens, whether they come from inside the body or from outside. Carcinogens include some chemicals, e.g., benzene, and chemical mixtures like cigarette smoke; physical agents like inhaled asbestos fibers; certain wavelengths of energy, e.g., ultraviolet solar radiation and x-rays; infections, especially certain viruses that can cause lymphoma or liver cancer; and rarely even parasites, including a worm that causes esophageal cancer in dogs.

Wikpedia

Asbestos fibers are a carcinogen.

Some agents cause cancer by chronic (repeated, long-term) organ damage necessitating a sustained increase in cell division to repair the damage. This increase in reparative cell division unfortunately also increases the chance for mutations in cells that can then divide and grow out of control. The most effective carcinogens, called complete carcinogens, both increase cell division and cause genetic mutations. Solar ultraviolet rays and tobacco smoke are complete carcinogens. Combining potent carcinogens like tobacco smoke with other inhaled carcinogens, like oak sawdust or asbestos, has a synergistic effect; together they are more dangerous than simply the added risks.

Hormones, including those normally produced by our bodies (especially estrogen and testosterone) are also carcinogens for hormonally-responsive tissues, like the breast and prostate gland. This is just one reason why hormones (anabolic steroids) taken to improve sports performance are so dangerous. Increasing hormone exposure in the form of drugs should always be under the advice of a doctor. Another major risk factor for many cancers is obesity. Unfortunately, if you live long enough you will probably get some sort of cancer, whether a life threatening type or one that is easily treated in its early stages. In autopsy studies of men in their 70s who had died from other causes, approximately 80% also had prostate cancer at the time they died; they died with it, but they didn't die from it. Cancer seems a poor reward for living a long life, but as life expectancy has increased, so has the incidence of cancer.

Cancer develops when genetic mutations accumulate, speeding up cell division while inhibiting programmed cell death. Programmed cell death is an important process to regulate tissue size and shape and to remove defective cells. When genes that control programmed cell death, also called tumor suppressor genes, mutate to an inactive form, defective cells do not die as they should. Meanwhile, additional mutations cause other cancer genes to be much more active than normal, which causes the defective cells to replicate out of control. The process has been compared to a car with bad brakes and a stuck accelerator.

Everything necessary to cause many cancers is present in normal people. So why do we say that certain things cause cancer? That's because they increase

Continued on back…

Fast Facts...

To learn more about cancer, including data about cancer in Michigan, and information about all the different kinds of cancer, check out the Internet references listed below.

INFORMATIVE WEBSITES

Michigan Department of Community Health: Summary Cancer Information & Statistics

http://www.mdch.state.mi.us/pha/osr/index.asp?Id=13

National Cancer Institute (NCI)

http://www.cancer.gov/

American Cancer Society (ACS)

http://www.cancer.org/docroot/home/index.asp

American Cancer Society: Statistics for 2008

http://www.cancer.org/docroot/STT/STT_0.asp

MedicineNet, Inc.

http://www.medicinenet.com/cancer/focus.htm

Wikipedia

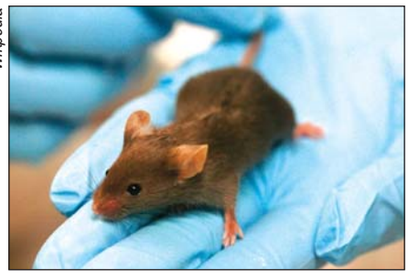
http://en.wikipedia.org/wiki/Cancer

www.mismr.org

The Big "C"... *Continued from front*

the incidence over the number that would occur spontaneously (without an external cause). Some cancers are very rare in people not exposed to certain carcinogens; for example, pulmonary mesothelioma, a malignant tumor of the outside surface of the lung, is very rare except in workers exposed to asbestos fibers. Likewise, the incidence of spontaneous cancer of the lung is very low, but it is dramatically increased by smoking tobacco, as are many other cancers, including cancer of the larynx, mouth, colon, pancreas, kidney, and urinary bladder. DON'T SMOKE!

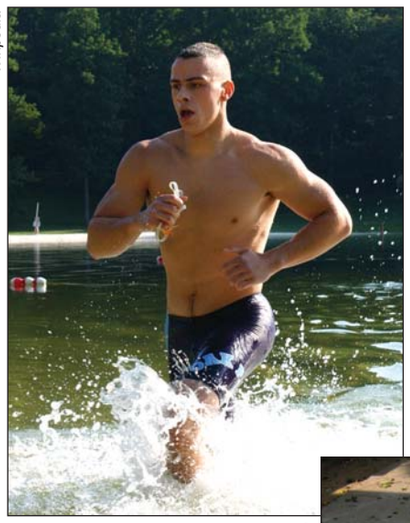
Wikpedia



Genetically altered mice are increasingly used in cancer research.

Animals get virtually all of the kinds of cancer that humans get. If you have lived with an old dog or cat in your home, you might know this first hand. That is why animals, usually rats and mice, are used to identify carcinogens, discover how they work, and to develop new ways to treat cancer. To save time and money and reduce the number of research animals used, genetically altered mice that are predisposed to develop cancer at a younger age are increasingly used for this work. Animal research has been and will continue to be critical for learning more about the many causes and cures for cancer. While hundreds of books and tens of thousands of research papers have been written on cancer, it is still a very fertile and rewarding field if you are considering a career in the biological sciences.

Wikpedia



Tips for Staying Healthy

The best advice to decrease or delay your chance of getting cancer and staying healthy to a ripe old age is fairly simple:

- **Don't use tobacco in any form**
- **If you drink alcohol do so in moderation**
- **Eat plenty of fruits and vegetables**
- **Stay physically fit**

But, of course there is much more to know about the individual risks each of us faces.

Wikpedia

A healthy lifestyle to ward off cancer includes exercise and a diet rich in fruits and vegetables.

For more information about cancer check out the informative websites listed to the left.

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