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(Lower Myanmar)
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The objective of this Bulletin is to disseminate international news about health and medicine, developments, activities in medical and health research in DMR (LM). The Bulletin is published monthly and delivered to township hospitals.

The Editorial Committee, therefore, invites contributions concerning information about research activities and findings in the field of medicine and health.

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News about Medicine & Health

Antibiotic Resistance

Background

Antibiotic resistance occurs when an antimicrobial drug is no longer effective in killing or stopping the growth of particular micro-organisms, such as bacteria. The term antimicrobial refers to both natural and synthetic substances like antibiotics and disinfectants which can kill or block the reproduction of microorganisms. Until the 1940s, when antibiotic drugs were discovered, people with infections such as tuberculosis, pneumonia and sexually transmitted diseases often died because the available treatments were not very effective. With the discovery of new drugs, the ability to fight diseases improved dramatically. However, since then, some germs have become resistant to these drugs.

The causes of antibiotic resistance

A major cause of resistance is believed to be overuse or inappropriate use of drugs such as antibiotics, in preventing or treating infections in people, animals and plants. Germs constantly adapt to their environment and have the ability to take on the characteristics of other germs. When antibiotics are used inappropriately, the weak bacteria are killed, while the stronger, more resistant ones survive and multiply. Germs that develop resistance to one antibiotic have the ability to develop resistance to another antibiotic.

This is called cross-resistance. Links have also been made between giving drugs to animals and the development of resistance in humans. Drugs are often given to food-producing animals to treat and prevent infections in the agri-food industry and to promote growth. Products are also sprayed on fruit trees to prevent or control disease. These can then be transferred to humans in meat, milk, fruit or drinking water, adding to the resistance problem. An example of this is drug-resistant Salmonella, which can be transferred from animals to humans through the food chain. Other factors that cause resistance include an incorrect diagnosis that results in an inappropriate drug being prescribed, or not taking an antibiotic prescription according to the instructions; for example, not taking all of a prescription. You can be exposed to drug-resistant germs in the same way you get other infections, through:

- contaminated food, water or soil
- unsafe sexual practices
- contact with infected people or animals
- during treatment in a clinic or hospital

Safe use of antibiotics

Proper diagnosis is the first step in the effective treatment of any infection. Visit your doctor for a proper assessment. Be aware that antibiotics are not effective for everything. For example, antibiotics are not effective against viruses, such as colds and flu. Also, specific germs can be treated more effectively with drugs that are targeted to them. This often requires a lab test. Take medication as directed by your doctor or pharmacist. Do not stop taking a prescription part way through the course of treatment (unless you are having a serious adverse reaction) without first discussing it with your doctor. Even if you feel better, use the entire prescription as directed to make sure that all of the germs are destroyed.

- Do not share prescriptions with anyone else. Taking an inappropriate drug makes the resistance problem worse.
- Do not flush out-of-date or unused medication down the toilet, or pour it down the sink, or put it in the garbage. If you do, this medication will end up in the water table which could increase the drug resistance problem. Instead, check to see if your pharmacy has a drug recycling program that disposes of unused drugs in an environmentally safe manner. If your area does not have such a program, take the drugs to your municipal waste disposal depot for proper disposal.

Minimizing your risk

You can help prevent and reduce drug resistance by taking the following steps:

- Avoid the use of antibacterial soap and "bacteria-fighting" cleaning products. These products kill good' bacteria which fight bad germs. Cleaning with soap and water, or disinfecting surfaces with a solution of water and vinegar or household bleach is adequate.
- Wash your hands regularly with soap and water for at least 20 seconds. It is the most effective way of preventing any type of infection.
- Have your doctor vaccinate you and your children and keep vaccinations up to date.
- Store, handle and prepare food safely. When preparing food be sure to wash cutting boards and knives with detergent and water.
- Use bleach on surfaces where you have handled raw poultry.
- Thoroughly wash all fruits and vegetables that will be eaten raw.
- If you use well water, have it tested regularly.
- Encourage farmers to give antibiotics to their animals only when needed.

Source: http://www.hc-sc.gc.ca/ hl-vs/ alt-formats/pacrb-dgapcr/pdf/iyh-vsv/med/antibiotic-eng.pdf

Contributed by Bacteriology Research Division

Fighting Cancer with the Help of Salmonella

University of Minnesota Masonic Cancer Center researchers believe salmonella may be a valuable tool in the fight against cancer in organs surrounding the gut-such as the liver, spleen, and colon - since that's where salmonella naturally infects the body.

Researchers want to "weaponize" salmonella, allowing the bacteria to then attack cancer cells in its natural environment. University of Minnesota trials in animals have already shown salmonella can successfully control tumors in the gut and human clinical trials are already underway.

Edward Greeno, M.D., lead researcher on the clinical study and Medical Director of the Masonic Cancer Clinic stated that many bacteria and viruses - even harmful ones - could be used to fight disease and it might even be possible to use bacteria to fight cancer. So the key for this research initiative was to find a way to get the tumor fighting abilities of salmonella delivered to the patient - without making the patient sick.

What they came up with:

- Greeno's Medical School colleague, Dan Saltzman, M.D., Ph.D., genetically modified a batch of salmonella to weaken it and added Interleukin 2, or IL-2. He mentioned that IL- 2 could be thought as a guard dog that sniffs around looking for threats inside the body. When it finds one, it calls in an attack by the immune system.
- Researchers knew if they could make IL-2 near tumors, it would identify the cancerous cells as a threat and trigger an immune response near the tumor.
- Salmonella naturally finds its way to a person's gut and associated tissues. Salmonella also naturally likes to grow inside of tumor cells. To treat cancer in the bowels, the nearby lymph nodes or the liver – salmonella is a perfect method to deliver a package of IL-2.

In a nutshell, by using genetically modified salmonella packaged with IL-2, Medical School researchers have created a kind of two-prong attack on cancer - the immune response called in by IL-2, and the salmonella itself. The therapy is administered simply - mixed with a few ounces of water and imbibed orally. Greeno finally told that probably wouldn't replace other ways of treating cancer such as chemotherapy and radiation. It is a promising area of study and it could be a potent tool in the battle against cancer. It also has potential to be a much cheaper and less toxic alternative to chemotherapy and radiation.

*Source:*http://www.medicalnewstoday.com/

Contributed by Biochemistry Research Divison

Inhalant Abuse

Inhalant drugs are a broad range of drugs whose volatile vapors are taken in via the nose and trachea for recreational purposes. Inhalants are taken by volatilization, and do not include drugs that are inhaled after burning or heating. For example, amyl nitrite and toluene are considered inhalants, but tobacco, marijuana are not.

While some inhalant drugs are used for medical purposes, as in the case of nitrous oxide (a dental anesthetic). Inhalant drugs are used by the children, teenagers, incarcerated people, and impoverished people, because these solvents and gases are ingredients in hundreds of legally available, inexpensive products, such as correction fluid, hair spray, adhesives and aerosol air fresheners. The most serious inhalant abuse occurs among children and teens who are living on the streets completely without family ties.

Inhalant users inhale vapor or aerosol propellant gases using plastic bags held over the mouth or by breathing from a solvent-soaked rag or an open container. The effects of inhalants range from an alcohol-like intoxication and intense euphoria to vivid hallucinations, depending on the substance and the dosage. Some inhalant users are injured due to the harmful effects of the solvents or gases or due to other chemicals used in the products that they are inhaling. In some cases, users have died from hypoxia (lack of oxygen), pneumonia, cardiac failure or arrest, or aspiration of vomit.

In most of the developing countries, inhalant users inhale adhesive because it is cheap and readily available. In India, "dendrite" is the popular adhesive brand used by inhalant users. Most adhesive contains a substance called toluene, a sweet smelling and intoxicating hydrocarbon which is neurotoxin. When these intoxicants are smeared on a piece of cloth and inhaled, the users feel euphoric (high, and experience a sense of invincibility). But they dissolve the membrane of the brain cells and causes hallucinations.

Symptoms of the addiction are abdominal pain, vomiting, diarrhea, chemical smell on clothing, hair and breath, stain on fingers and hands, drooling and spitting, watery and bloodshot eyes, headaches and dizziness. Other signs are depression, fears, and phobias, lack of concentration, emotional withdrawals, feeling of cold, hallucinations, sudden changes in routine, trouble at school. These symptoms are often called "Adhesive Syndrome". Adhesive Syndrome may cause wrong diagnosis for medical doctors and make it under reported in many developing countries. Myanmar, one of the developing countries, needs keep an eye upon these inhalant abuses because it attacks many youths most productive years of their life.

Source: 1. http://www.worldvision.in/ 1426
2. http://en.wikipedia. org/ wiki/ Inhalant_abuse

Contributed by Chemical Toxicology Research Division

Stem Cell Research - Pros and Cons

The debate of the pros and cons of stem cell research clearly illustrate the difficult ethics evaluations researchers sometimes must do. All scientists must consider whether the positive effects from their research are likely to be significantly higher than the negative effects. Stem cells are crucial to develop organisms. They are nonspecialized cells which have the potential to create other types of specific cells, such as blood-, brain-, tissue- or muscle-cells.

Stem cells are in our body all our lives, but are far more potent in a fetus than in an adult body. Some types of stem cells may be able to create all other cells in the body. Others have the potential to repair or replace damaged tissue or cells. Embryonic Stem Cells are developed from a female egg after it is fertilized by sperm. The process takes 4-5 days.

What is stem cell research?

Stem cell research is used for investigation of basic cells which develop organisms. The cells are grown in laboratories where tests are carried out to investigate fundamental properties of the cells. There are stem cells in the both placenta and blood contained in the placenta. Also the primary source of stem cells is from blastocysts. These are fertilized human eggs that were not implanted into a woman. The controversy surrounding stem cell research led to an intense debate about ethics. Up until the recent years, the research method mainly focused on Embryonic Stem Cells, which involves taking tissue from an aborted embryo to get proper material to study. This is typically done just days after conception or between the 5^{th} and 9^{th} week.

Since then, researchers have moved on to more ethical study methods, such as Induced Pluripotent Stem Cells (iPS). iPS are artificially derived from a non-pluripotent cell, such as adult somatic cells. This is probably an important advancement in stem cell research, since it allows researchers to obtain pluripotent stem cells, which are important in research, without the controversial use of embryos. There were two main issues concerning stem cell research with both pros and cons:

1. How the knowledge will be used
2. Cocerns about the methods

The first issue is really not just about stem cell research, as it may be applied to most research about human health. Since 2007, the second point, concerns about the methods involved, has been less debated, because of scientific developments such as iPS.

1. Stem cell research- arguments regarding the usage of the knowledge

As you will most probably notice, the following arguments are not exclusively in use when taking about stem cell research.

Pros

Stem cell research can potentially help treating a range of medical problems. It could lead humanity closer to better treat and possibly cure a number of diseases: parkinson's disease, alzheimer's disease, heart diseases, stroke and diabetes (type 1), birth defects, spinal cord injuries, replace or repair damaged organs, reduced risk of transplantation (You could possibly get a copy of your own heart in a heart-transplantation in the future), stem cells may play a major role in cancer. Better treatment of these diseases could also give significant social benefits for individuals and economic gains for society.

Cons

- "We should not mess with human life".
- "Humans should not be trying to play God"
- Some argue that stem cell research in the far future can lead to knowledge on how to clone humans. It is hard to say whether this is true, but we have seen devastating consequences of other research-programs, even with good intentions, such as nuclear research.

2. Stem cell research–pros and cons about the methods involved

The controversy regarding the method involved was much tenser when researchers used Embryonic Stem Cells as their main method for stem cell research.

Disclaimer:

These points are based on the old debate about the methods of stem cells research, from before 2007. Since then, scientists have moved on to use more ethically methods for stem cell research, such as iPS. This section serves as an illustration of difficult evaluations researchers may have to analyze.

Pros before 2007

"The benefits of stern cell research have such a great outcome that they outweigh the ethical issues." (Cost-benefit-analysis) "If someone is going to have an abortion, isn't it better that we use it for something useful?" Adult stem cel1s would not be that interesting because they do not have the same properties as stem cells from a fetus. The research would give great insights about the basics of the body.

Cons before 2007

- Critics against stem cell research argued that the ethical issues of scientific work on aborted fetuses did not justify the possible benefits.
- "A life is a life and that should never be compromised. A fertilized egg should be valued as a human life even if it is in its very first weeks. Destroying human life in the hope of saving human life is not ethical".
- We should (and will) develop more ethical methods (such as using adult stem cells) which will enable us to research ethically. We should wait until those methods are available.
- The scientific value has been overstated or has flaws. E.g. we do not know for sure that we can use stem cells to clone transplantable organs.

Conclusion

The stem cell-research is an example of the, sometimes difficult, cost-benefit analysis in ethics which scientists needs to do. Even though many issues regarding the ethics of stem cell research have now been solved, it serves as a valuable example of ethical cost-benefit analysis. The previously heated debate seems to have lead to new solutions which makes both sides happier. Stem Cell pros and cons had to be valued carefully, for a number of reasons.

When you are planning a research project, ethics must always be considered. If you cannot defend a study ethically, you should not and will not be allowed to conduct it. You cannot defend a study ethically unless the presumed cost is lower than expected benefits. The analysis needs to include human/animal discomfort/risks, environmental issues, material costs/benefits, economy etc.

Why was the debate regarding the stem cell research so intense? First, it was a matter of life - something impossible to measure. And in this case, researchers had to do exactly that: measure life against life.

Both an abortion and someone dying, suffering from a possible curable disease, is a tragedy. Which have the highest value? Does a big breakthrough in the research justify the use of the method in the present?

Would the benefits of studying abortions outweigh the costs? The choice was subjective: Nobody knows all the risks or all the possible outcomes, so we had to value it with our *perception* of the outcome. Perception is influenced by our individual feelings, morals and knowledge about the issue.

Second, at the time we did not know whether the research was necessary and sufficient to give us the mentioned health benefits. Third, other consequences of the research are uncertain. Could the research be misused in the future or not? We simply do not know. All knowledge acquired, within research or other arenas, may be used for evil causes in the future- it is impossible to know.

The Stem cell research-debate is an example on how people value various aspects differently. It is also an example of how critics and debate can lead to significant improvements for both sides.

Source: http://www.experiment-resources.com/
Contributed by Scientific Group on Blood Research

Basic Requirement for Sample Size Determination

Often times, a researcher will question whether or not sample size is large enough for the purposes of the particular study. The 'right' sample for the particular study depends on many factors, including the following:

- Cost consideration (e.g., maximum budget, desire to minimize cost)
- Administrative concerns (e.g., complexity if design, research deadlines)
- Minimum acceptable level of precision
- Confidence level
- Variability within population or sub population (i.e., stratum, cluster) of interest
- Sampling method

The larger your sample size, the more sure you can be that the answer truly reflect population. This indicates that for a given confidence level, the larger your sample size, the smaller your confidence interval.

Confidence level tells you how sure you can be. It is expressed as a percentage and represents how often the percentage of population who would pick an answer lies within the confidence interval. The 95% confidence level means you can be 95% certain; the 99% confidence level means you can be 99% certain. When you put confidence level and confidence interval together, you can say that you are 95% that true percentage of population is between 0_1% and 0_2%. The wider the confidence interval you are willing to accept, the more certain you can be that the whole population answer would be within in that range.

Contributed by Health Systems Research Division

Abstracts of Research Papers Published or Read Abroad by DMR (LM) Scientists

FTA Card Utility for PCR Detection of *Mycobacterium leprae*

The suitability of the FTA® elute card for the collection of slit skin smear (SSS) samples for PCR detection of *Mycobacterium leprae* was evaluated. A total of 192 SSS leprosy samples, of bacillary index (BI) 1 to 5, were collected from patients attending two skin clinics in Myanmar and preserved using both FTA® elute cards and 70% ethanol tubes. To compare the efficacy of PCR detection of DNA from each BI class, PCR was performed to amplify an *M. leprae*-specific repetitive element. Of the 192 samples, 116 FTA® elute card and 112 70% ethanol samples were PCR positive for *M. leprae* DNA. When correlated with BI, area under the curve (AUC) values of the respective receiver-operating characteristic curves were similar for the FTA® elute card and ethanol collection methods (AUC=0.6). Taken together, our results indicate that the FTA® elute card, which enables the collection, transport, and archiving of clinical samples, is an attractive alternative to ethanol preservation for the detection of *M. leprae* DNA.

Source: Khin Saw Aye, *et al.* Japanese *Journal of Infectious Diseases* 2011; 64: 246-248.

RECENT ARRIVALS AT CENTRAL BIOMEDICAL LIBRARY, DMR (LM)

1. IPCS: International programme on chemical safety/concise international chemical assessment document, 2010.
2. Nonmelanocytic tumors of the skin; AFIP atlas of tumor pathology series 4 Fascicle 4; Patterson JW, Wick MR, 2006.
3. Tumors of the Adrenal Glands and Extra adrenal Para-ganglia; AFIP Atlas of tumor pathology series 4 Fascicle 8, Lack EE, 2007.
4. Tumors of the central nervous system; AFIP atlas of tumor pathology series 4 Fascicle 7, Font RL, Croxatto JO, Rao NA, 2007.
5. Tumors of the eye and ocular adnexa; AFIP atlas of tumor pathology series 4 Fascicle 5; Ramon L. Font, Croxatto JO, Rao NA, 2006.
6. WHO TDR News 2010 May; No. 85.

7. WHO TDR News 2010 December; No. 86.
8. WHO: Cancer survival in Africa, Asia, the Caribbean and Central America, 2011.
9. WHO: Drug Information 2010; 24 (1).
10. WHO: Drug Information 2010; 24 (4).
11. WHO: Frequently asked questions (FAQS) on antimicrobial resistance: Use antibiotics rational, 2011.
12. WHO: Global status report on alcohol and health, 2011.
13. WHO: Guidelines for strengthening participation of persons affected by leprosy in leprosy services, 2011.
14. WHO: Injury prevention and safety promotion, 2010.
15. WHO: Monitoring equity in access to AIDS treatment programme: A review of concepts, models, methods and indicators, 2011.
16. WHO: Prevention of iron Deficiency anemia in Adolescents, 2011.
17. WHO: Regional Health Forum: Special Issue, 2010; 14 (1).
18. WHO: Social determinants approaches to public health: from concept to practice, 2011.
19. WHO: Special theme: Communicable diseases in South East Asia, 2010.
20. ဦးလှမြင့်(ဂန္ဓမာ)၊ လေဖြတ်ဝေဒနာအကြောင်းသိကောင်းစရာများ(Understanding Stroke)၊ ၂၀၁၁။
21. ဦးလှမြင့်(ဂန္ဓမာ)၊ သွေးတိုးရောဂါအကြောင်းသိကောင်းစရာများ(Understanding High Blood Pressure)၊ ၂၀၁၁။
22. မောင်အေးမြ၊ စာရင်းသမားမျက်စိ(In the eyes of an Accountant)၊ ၂၀၁၁။

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၁ Making Health Policy: Role of Research
၂ Challenges in Research Ethics
၃ Biosafety Practices in Diagnostic Laboratories
၄ Combat Antimicrobial Resistance: No Action Today, No Cure Tomorrow
၅ Symposium on Cancer
၆ Impact of Oral Health on General Health
၇ Progress Towards Malaria Control in Myanmar
၈ Healthy Life Style & Obesity
၉ Advances of Surgery and Diagnostic Imaging in Japan

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