

## New Malaria Drugs Stop Parasite Early

Difficulty:

**DIFFICULT**

Date of release:

Tuesday 29 November 2011

### *Discussion activities to be done after completing this EA lesson*

Today's report was about new drugs to combat malaria. Are they vaccines or treatment? How do they work? What is the current state of research?

### *Extension discussion topics*

#### **A. Talking about and going over the specific topic / idea / issue in listening text**

*Introduction = What is the context of the research described in the report? What is the current state of this research?*

1. What do we learn in the report about malaria and the malaria parasite?
  - Malaria is transmitted by mosquitoes which leave a parasite in the blood.
  - There are two dominant strains of the malaria parasite, Plasmodium vivax and Plasmodium falciparum.
  - They differ in geographical distribution, severity of disease and behavior.
  - Vivax mostly found in Asia and Latin America: falciparum is dominant in Africa.
  - Falciparum is more dangerous ("deadly") than vivax.
  - Vivax can remain dormant in the liver (previously common in Europe), falciparum cannot.
2. What do we learn in the report about the scientific team that ran the project?
  - Scientists at Scripps Research Institute and other institutions.
  - Elizabeth Winzeler led the research. Authors of the research paper included her colleague Stephan Meister and Elizabeth Winzeler.
3. What do we learn in the report about the research itself?
  - Objective: to find substances which can kill the vivax parasite in its dormant liver stage.
  - First phase: evaluation of compounds known to kill the parasite.
  - This involved testing the effects of thousands of substances on live parasites using sophisticated technology (automated microscopes, 100 images from each substance, computerized analysis of the effects).
  - Second phase: testing of "promising compounds" on laboratory mice.

- A group of mice were deliberately infected with the parasite. Half received an oral dose of the compounds identified in phase 1, half did not.
- The treated mice were cured or did not develop the disease, the untreated mice died within 10 days.
- The most effective substances are called IZPs.
- Next (possible) phase: Safety testing on humans to see if the "mouse model" can be transposed.

## B. Expanding on (one of) the topics / ideas / issues in listening text

*Topic = Extent, effects and prevention of malaria.*

You have already learnt quite a lot about malaria from the report. If possible, do some Internet research work to find out more about the extent, effects and the prevention of malaria. Suggested links:

[http://www.malariavaccine.org/RTSSPhase3\\_05-27-2009.php](http://www.malariavaccine.org/RTSSPhase3_05-27-2009.php)

<http://www.gatesfoundation.org/topics/Pages/malaria.aspx>

<http://www.malariavaccine.org/pr2011Oct18-RTSS.php>

<http://en.wikipedia.org/wiki/Malaria>

- Extent: tropical and sub-tropical countries. 225 million cases per year. Nearly 1 million deaths per year, in 85% of cases in young children. Most deaths in sub-Saharan Africa (because of the deadliness of falciparum).
- Effects: fever, headaches, fatigue and, in severe cases, coma and death (see above).
- Prevention: two lines of attack -
  - on the mosquito which transmits the disease (spraying of pesticides, use of treated mosquito nets around beds, ...).
  - on the disease itself with drugs (traditionally quinine, but new drugs have more or less replaced quinine). The problem is that the mosquito develops resistance to drugs (and pesticides). The search is well advanced for a malaria vaccine (the PATH Malaria Vaccine Initiative).

In the light of what you have discovered, compare the usefulness of the research described in the report with the PATH MVI (Malaria Vaccine Initiative) Project. Given that falciparum kills people, but vivax does not, is it justified to spend money and kill laboratory mice to combat the vivax parasite in its dormant stage?

## C. Extending discussion of (one of) the topics / ideas / issues in listening text

*Topic = Animal rights and laboratory testing.*

1. In the report you heard that mice were deliberately infected with the malaria parasite and that those in the control group "died within 10 days". The mice that were "cured or never developed malaria" were probably killed after the experiments. The Animal Rights Movement advances the idea that the basic interests of animals should be given the same consideration as the interests of human beings. This movement is therefore opposed to the (unnecessary) use of animals in laboratory tests. One branch of the movement pursues its aims in a non-violent way (persuasion, non-violent demonstrations), another, more radical, branch (the Animal Liberation Front) uses more extreme methods; attacks on laboratories to "liberate" animals used for testing, intimidation of the staff of these laboratories, ... . What is your position on the use of animals in scientific testing? List the arguments for and against. Compare your lists with a partner or with your teacher.

2. Using the arguments that you have identified (see below), debate with a partner or with your teacher the pros and cons of the use of animals in scientific testing. One of you should argue for, the other against.

Arguments For	Arguments against
Animal testing is necessary to develop new drugs to save human lives.	Animal testing is cruel and degrading to animals, which are used as disposable objects.
Animal welfare is respected in laboratories - animals are well treated in respect of their food and other basic necessities.	Animals have feelings which are not respected in test laboratories where they are just part of the equipment.
Without animal testing, many diseases would continue to exist and we would not have the scientific knowledge that we have today, for example, of the structure of DNA and of the human genome (preliminary work done in mice).	Animal testing is often used for the development of products and knowledge which is unnecessary or futile, for example: - to develop new products in the cosmetics industry. - the use of dogs (beagles) forced to smoke cigarettes to prove that smoking was harmful to health (when it was already known). - the use of monkeys to test seat belts in the crash tests of cars.
...	...

### Audioscript

U.S. medical researchers are reporting what could be a significant breakthrough that may help prevent infection by one of the two most widespread varieties of malaria.

The new class of anti-malaria compounds they developed was highly successful in animal tests but its effectiveness in humans is still unproven.

Plasmodium vivax is the dominant strain of the malaria parasite outside Africa. Unlike the more deadly Plasmodium falciparum, vivax can infect a person but stay dormant in the liver for months or even years, before emerging to cause disease.

Scientists at the Scripps Research Institute in California and other institutions evaluated chemical compounds that were known to kill the malaria parasite in the blood. They were looking for ones that also might kill the parasite in its dormant liver stage.

In this study, the researchers mixed each one of the compounds with malaria parasites taken from live mosquitoes. Each combination was put with liver cells into individual compartments, called wells, on a microscope slide. Author Elizabeth Winzeler explains that to screen thousands of chemicals as potential malaria drugs required some sophisticated technology.

"We used an automated microscope to go and take about 100 images of each of the wells, and then we used computer scripts to analyze the images and identify those wells that had compounds that appeared to affect the development of the parasites."

To test potential drugs developed from the chemicals that looked promising, Winzeler and her colleagues infected laboratory mice with the malaria parasite. Left alone, the mice died within 10 days.

"If you give the mice the same treatment, and you give them a small oral dose of the compounds that we made, the mice are cured or they never develop malaria in the first place."

These new substances, called IZPs, are effective in mice, Winzeler says.

"But there's always a big step between going from something that works in a mouse model and actually going into something that's safe and efficacious in humans."

Researchers at Scripps, backed by the pharmaceutical company Novartis, are now considering that next step, safety testing in humans.

If successful, this work could lead to a malaria drug that attacks the dormant stage of the parasite, which occurs only in the *Plasmodium vivax* form of the disease. Scientists theorize that this period of dormancy was an evolutionary strategy to keep infection active through the cold winter months.

"For example, vivax malaria was found in places like Finland and England, up until about 100 years ago. And clearly, there weren't mosquitoes out biting people in December."

Vivax now occurs mainly in Asia and Latin America.

Elizabeth Winzeler, first author, Stephan Meister and their colleagues describe their findings in a paper published online by the journal Science.

That's today's (VOA) Health Brief. This is Art Chimes reporting.