
Science & Technology

Finally, a Vaccine for Malaria!

In a [news release](#) issued Oct. 6, the UN's World Health Organization (WHO) announced that after 30 years of research and clinical trials by Glaxo-SmithKline, it is now recommending widespread use of a vaccine, RTS,S/AS01 (brand name Mosquirix), the first ever, against *Plasmodium falciparum*, the most deadly malaria parasite globally, and the most prevalent in Africa.

Dr. Matshidiso Moeti, WHO Regional Director for Africa: "For centuries, malaria has stalked sub-Saharan Africa, causing immense personal suffering. We have long hoped for an effective malaria vaccine and now for the first time ever, we have such a vaccine recommended for widespread use. Today's recommendation offers a glimmer of hope for the continent which shoulders the heaviest burden of the disease, and we expect many more African children to be protected from malaria and grow into healthy adults."

"This is a historic moment. The long-awaited malaria vaccine for children is a breakthrough for science, child health and malaria control," said WHO Director-General Dr. Tedros Adhanom Ghebreyesus. "Using this vaccine on top of existing [non-medical] tools to prevent malaria could save tens of thousands of young lives each year."

Malaria kills more than 400,000 people around the world every year, mainly in sub-Saharan Africa, where more than 260,000 African children under the age of 5 die from it annually.

The RTS, S/AS01 vaccine is ad-

ministered in a schedule of 4 doses in children from 5 months of age. To date, more than 2.3 million doses have been administered in the three pilot countries of Ghana, Kenya, and Malawi.

The Bill & Melinda Gates Foundation provided catalytic funding for late-stage development of RTS,S between 2001 and 2015.

Although the development of RTS,S/AS01 is certainly good news, it should be put in context. Twenty years ago, *21st Century Science and Technology* magazine [reported](#) in its Fall 2002 issue:

"During the 1960s, the WHO proposed the possible eradication of malaria, worldwide; and malaria control was achieved in areas with a population of 279 million people. Thirty-six formerly malarious countries totally eradicated the disease. In 1970, the U.S. National Academy of Sciences stated: 'To only a few chemicals does man owe as great a debt as to DDT. In little more than two decades DDT has prevented 500 million human deaths, due to malaria, that would otherwise have been inevitable.'"

In the almost 50 years since the ban of DDT, William Ruckelshaus, the first head of the Environmental Protection Agency and the Malthusian anti-development-academic establishment and their apologists and labile media, have been responsible for the deaths of on the order of 1.25 billion people.

A Pill To Treat COVID-19 Is Coming

On Oct. 11, The Merck pharmaceutical company [announced](#) it has applied to the Food and Drug Administra-

tion (FDA) for emergency use authorization (EUA) for a promising new drug treatment that could be given as a pill to prevent mild-to-moderate COVID-19 disease. Molnupiravir would be given within a few days after symptoms arise. Merck is recommending it for high-risk adults. It has not yet been determined whether it should be given to those who are vaccinated, or the unvaccinated, or both.

New Vaccine Candidate Against African Swine Fever Virus

In other very good news, on May 6, the U.S. Department of Agriculture's Agricultural Research Service (ARS) [announced](#) that an African Swine Fever Virus vaccine candidate has been adapted to grow in a continuous cell line, rather than having to rely on live pigs and their fresh cells.

"This [scientific breakthrough] opens the door for large-scale vaccine production [not previously possible], which is a valuable tool for the possible eradication of the virus," said senior ARS scientist Dr. Manuel Borca.

African swine fever (ASF) is a devastating haemorrhagic fever of pigs that causes up to 100 % mortality. Fortunately, African Swine Fever is not a threat to humans and cannot be transmitted from pigs to humans. However, it can devastate meat supply. Two years ago, half of China's swineherd was wiped out by ASF, and the measures needed to combat it included both loss of infected animals and precautionary slaughter of entire herds by farmers worried that their animals might soon be infected. At present, it has jumped to

the Americas, and is in Haiti and the Dominican Republic.

ASF is caused by a unique DNA virus that is maintained in an ancient cycle between warthogs and argasid ticks, making it the only known DNA arbovirus. Warthogs and ticks transmit ASF to domesticated pigs. So far, there have not been any outbreaks in the United States.

The new discovery, highlighted in the *Journal of Virology*, overcomes one of the major challenges for manufacturing of an African Swine Fever Virus vaccine. The newly developed vaccine, grown in a continuous cell line—in which immortalized cells divide continuously or otherwise indefinitely—has the same characteristics as the original vaccine produced with fresh swine cells.

“Traditionally we used freshly isolated swine cells to produce vaccine candidates, and this constitutes a significant limitation for large-scale production” said senior ARS scientist Dr. Douglas Gladue. “But now we can retain the vaccine characteristics while simultaneously replicating the vaccine in lab-grown cell cultures. We no longer have to rely on gathering fresh cells from live swine.”

Tested in a commercial breed of pigs, it was determined to be safe, protecting the pigs against the virus. No negative effects were observed.

The Agricultural Research Service is the U.S. Department of Agriculture’s chief scientific in-house research agency. ARS focuses on solutions to agricultural problems affecting America. Each dollar invested in agricultural research results in \$17 of economic impact.

A New Variety of Wheat Using Nuclear Mutation Breeding

In a ceremony in Vienna, Austria

Sept. 26, the UN’s Food and Agriculture Organization (FAO) and the International Atomic Energy Agency (IAEA) gave their highest international award in the field of nuclear technology applications in agriculture jointly to Guo Huijun, an associate researcher of the Institute of Crop Science of the Academy of Agricultural Sciences, Beijing, China; and Yang Zhen, a researcher of the Hunan Institute of Nuclear Agronomy and Aerospace Breeding, in recognition of their most recent work in breeding an improved variety of wheat, Luyuan 502, using various physical and chemical mutagenic factors such as gamma rays and space environment, to induce the genes of crop seeds to mutate.

Luyuan 502 has solved the problem of “lodging,” the bending over of the stems near ground level, making harvesting very difficult, thereby reducing yield. Luyuan 502 has increased the yield by 11% over traditional varieties, and is now China’s second largest wheat variety, accounting for 6.5% of the national wheat planting area. It is one of 11 wheat varieties developed for improved salt and drought tolerance, grain quality and yield.

New Results on the Origin of Interstellar Heavy Elements in the Early Universe

On Sept. 27, *Nature Astronomy* published a [study](#) by Professor Cai Zheng’s group from the Department of Astronomy of Tsinghua University on the origin of interstellar heavy elements in the early universe.

The findings show that the feedback effect of massive stars has a much greater influence on the origin of interstellar heavy elements in the early universe than previously recognized.

According to Zheng’s team, most matter in the universe is not *in* galaxies but dispersed in the vast space *between* galaxies. Soon after the Big Bang, they say, there were only large amounts of hydrogen and helium, and a small amount of lithium in the universe, and no heavier elements, such as carbon, nitrogen, and oxygen.

So, where did the heavy elements in the early universe come from, and how did they reach the interstellar medium? This is a key issue in observational cosmology.

According to Zheng’s team, the activity of small-mass galaxies had previously been thought to be the cause of the origin of heavy elements in the interstellar medium. Most of the searches and explorations in the optical band have failed to show that. So, Zheng and his team resorted to the Atacama Large Millimeter/submillimeter Array (ALMA Array) in northern Chile, the most powerful radio telescope in the world. Zheng’s team conducted many observations and after careful data analysis and processing, discovered a candidate galaxy, and a stellar wind feedback effect of massive galaxies which may be more important than previously thought.

Comparing this newly discovered galaxy’s mass with previous simulations, Zheng’s team found that it was 1-2 orders of magnitude heavier than theoretically predicted, and the relative distance between the galaxy and its metal absorber is also beyond the theoretical 1 magnitude of prediction.

Their discovery clearly shows that it may not be that the heavy elements originate from small-mass galaxies in the early universe, as predicted by numerical simulations, but that the contribution of massive galaxies is much more important than previously imagined.