Stop AMR Global Media Monitor

07 – 13 March 2020

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Study shows CRISPR effectiveness against colitis pathogen

A new research shows that the CRISPR-Cas system is efficient to target and eliminate Clostridioides difficile, a pathogenic bacterium responsible of the colitis disease.

To control the pathogen population, the researchers team used a bacteriophage loaded with a designed CRISPR system to specifically target and eliminate C. difficile bacteria.

While tested on mice infected with C. difficile, two days were enough to see a reduced level of pathogens. Nevertheless, it starts to grow back two days later.

The next steps for the researchers are to retool the phages to prevent the regrow phase but also to try multiple phages against multiple strains of C. difficile.

Source: EurekAlert!, 10 March 2020

Bacteria potentially involved in the development of type 2 diabetes

A study published in Nature Metabolism established a potential link between bacteria and the development of type 2 diabetes. It appears that diabetic and non-diabetic subjects differ in their bacterial signature in blood, liver and certain abdominal fat deposits.
This result come from samples collected on 40 patients during bariatric surgery. All of them were severely obese but only 50% of the patients were diabetics. The other part showed sings of insulin resistance but without being diabetic. The bacteria signature of diabetic patients was more closely related to the intestine signature than the one of the non-diabetic patients. It is well known that obesity increase the porosity of the intestinal barrier. Bacteria migrating from the intestine to other organs induce an inflammatory process that ultimately leads to diabetes as insulin cannot work properly.
The next step is to compare the results of severely obese patients with moderately and overweight ones. The researchers also want to check if some pathogenic bacteria are more harmful than other to trigger diabetes. On the opposite side, they want to check if some bacteria could prevent the trigger.

Source: EurekAlert!, 09 March 2020

Epidemiology study notes diversity of CRE in US hospitals

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Source: EurekAlert!, 09 March 2020

Study shows promising approach for the prevention and cure of gonorrhea in women

Gonorrhoea is one of the most commonly reported sexually transmitted infection with an increase in incidence over the last decade. If it affects both genders, 80% of the female case are asymptomatic. Untreated, this could lead to a pelvic inflammatory disease that could result in durable and harsh long-term health implications. The bacteria responsible of the gonorrhoea, *Neisseria gonorrhoeae*, are quickly antibiotic resistant.
The team discovered that two non-antibiotic drugs, while combined, could prevent and cure gonorrhoea infection in women. Those drugs, carbamazepine, an epilepsy treatment; and methlydopa, a treatment to prevent hypertension, while together, can outcompete the bacteria to access a binding-receptor on the human cell surface. While the cell is linked to the drugs, there is a change of behaviour leading the cell to kill the bacteria.
During the multiple experiments to test the efficiency of this method, they did not observe adaptation to the drugs, and it is not expected to happen.

Source : Medical Press, 10 March 2020

Study: 3-drug antimalarial regimens effective, could delay resistance

In some regions of the world, malaria's parasite is resistant to the usual 2-drug therapy to treat the infection. A study found that adding mefloquine to the 2 compounds of artemisinin usually prescribed increased the efficiency from 48% to 98% in the 42-day responses of area with common artemisinin resistance.
Researchers do not think that this new treatment should be implemented in areas without a spread resistance and should only be used as a stopgap. They strongly promote the research toward novel combination therapies to treat malaria.

Source: The Lancet, 11 March 2020

Statins starve cancer cells to death

Statin is a drug used daily to lower blood cholesterol levels. While testing the drug with human cells in labs, they found that statins, and especially pitavastatin were top contender in cancer-killing ability. It appears that asides blocking a liver enzyme that makes cholesterol, statins inhibit the creation of small molecules responsible for connecting cellular proteins to cellular membranes. While adding pitavastatin and this molecule, the geranylgeranyl pyrophosphate, or GGPP, cancer cells survived. This implies that GGPP have a crucial role in cancer cell survival.
After closely looking cancer cells treated with pitavastatin, they appeared to starve to death, being unable to take up proteins in their surrounding environment.

Devreotes says his team plans further research on the effects of statins in people with cancer and compounds that block GGPP.

Source: EurekAlert!, 12 March 2020