

MICROBIOTA

Depression linked to the microbiome

Nat. Microbiol. <https://doi.org/10.1038/s41564-018-0337-x> (2019)

Gut microbiome composition and metabolic capabilities are associated with depression and quality of life.

There is an increasing understanding of the importance of the communication between the gut and the brain in physiology and disease, and much of this is thought to be mediated by the gut microbiome.

A group of researchers from Belgium and Norway analyze data from the stool microbiomes of the Belgian and Flemish Gut Flora Project cohort and the Dutch LifeLines DEEP cohort, along with information on quality of life and depression. They find that certain species of bacteria are associated with depression and quality of life and that the metabolic products are also linked to measures of mental health. HS

<https://doi.org/10.1038/s41591-019-0396-4>

THERAPEUTICS

Direct-to-stomach delivery

Science **363**, 611–615 (2019)

A self-orientating millimeter-scale applicator (SOMA) is able to directly apply pharmaceutical agents to the stomach lining, allowing for efficient delivery of routinely injected therapeutics.

Healthcare professionals and patients alike consider swallowing a medication preferable to injecting it, but for biological products such as insulin, the challenging nature of the gastrointestinal tract limits the bioavailability of therapeutics delivered this way. The stomach lining is thought to be a better route of entry.

Researchers from Cambridge, Massachusetts, developed a SOMA that is modelled on the self-orientating leopard tortoise. They test its ability to administer insulin to pigs and find that the SOMA locates and penetrates the stomach lining, resulting in a therapeutic dose of insulin. This suggests that this technology could replace injections. HS

<https://doi.org/10.1038/s41591-019-0397-3>

NEURODEGENERATION

Linking Alzheimer's disease and frailty

Lancet **18**, 177–184 (2019)

An individual's degree of frailty modifies their clinical expression of Alzheimer's disease pathology.

It is known that the degree of pathology of Alzheimer's disease at autopsy doesn't always correlate with the clinical presentation of the disease; however, the modifiers of this relationship are unknown.

A group of researchers from North America analyzed data from the Rush Memory and Aging project, a cohort of Americans older than 59 years who underwent annual neuropsychological and clinical evaluations between recruitment and death.

They found that the degree of frailty modified the association between Alzheimer's disease pathology and Alzheimer's dementia. This has implications for clinical management, as those with high frailty might be at high risk for worsened Alzheimer's pathology. HS

<https://doi.org/10.1038/s41591-019-0399-1>

INFECTIOUS DISEASE

Mosquito deterrent

Cell **176**, 687–701 (2019)



Credit: Chris Bjornberg/Science Source

Small molecules that activate the pathway that regulates feeding behavior in mosquitoes can suppress their attraction to humans.

The strong attraction of female mosquitos to humans is suppressed for days after the mosquito has a blood meal, and leveraging the mechanism behind this could be a way to prevent mosquito bites and the resultant spread of infectious disease.

A group of researchers in the United States identified the receptor pathway that regulates feeding behavior as a candidate for post-blood-meal appetite suppression. They identify a small molecule that activates this pathway and show that mosquitoes fed with this compound are less attracted to humans for feeding. In the future, these molecules could be used for disease control. HS

<https://doi.org/10.1038/s41591-019-0398-2>

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HEALTH POLICY

E-cigarettes to help smoking cessation

New Eng. J. Med. <https://doi.org/10.1056/NEJMoa1808779> (2019)

In a randomized trial of smoking cessation, individuals that received an E-cigarette to use were more likely to cease smoking than those that used nicotine products designed to help quit smoking.

It is largely unknown how useful E-cigarettes are for quitting smoking in comparison with other nicotine products.

Researchers from the United Kingdom recruited 886 individuals who were seeking help to quit smoking from stop-smoking clinics. All participants received counseling in addition to either refillable second-generation E-cigarettes or nicotine replacement. After a year, those who had received an E-cigarette in addition to counseling were more likely to have abstained from smoking than those in the other group. HS

<https://doi.org/10.1038/s41591-019-0395-5>