

## BRAIN INJURY

### An unexpected response

*N. Engl. J. Med.* **380**, 2497-2505 (2019)

Some individuals with acute brain injury show signs of brain activity that are predictive of recovery.

Following acute brain injury, patients are considered clinically unresponsive if they are unable to follow commands. However, it is known that while visibly unresponsive, some patients experience cognitive-motor dissociation that makes them unable to carry out the task even if their brain responds to the commands.

A group of scientists from Columbia University/New York Presbyterian Hospital used electroencephalography to study 104 unresponsive patients who were in the intensive care unit as a result of severe brain injury. Using a machine-learning approach, they found that 16 of the patients had brain activation and that these patients were more likely to have a positive long-term outcome.

These findings could influence future decisions about the management of such patients. HS

<https://doi.org/10.1038/s41591-019-0551-y>

## INFECTIOUS DISEASE

### Rapid lower respiratory tract infectious diagnosis

*Nat. Biotechnol.* **37**, 783-792 (2019)

Lower respiratory tract infection pathogens can be identified rapidly using nanopore metagenomic sequencing.

Lower respiratory tract infections are treated initially using broad-spectrum antibiotics, as culture techniques to allow a specific diagnosis take too long. This can result in incorrect therapy and the development of antibiotic resistance.

Researchers in the UK have developed a metagenomic nanopore sequencing pipeline in which human DNA is first removed from infected individuals' sputum before analysis so that bacterial DNA can be identified. The pipeline takes 6 hours and so allows imminent correct diagnosis and therapy selection in the clinical setting. HS

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## MICROBIOME

### A microbiome aid for malnutrition

*Science* **365**, eaau4732 (2019)

*Science* **365**, eaau4735 (2019)

A diet that aids the natural progression of microbiome maturation can combat malnutrition in children.

Childhood malnutrition results in impaired growth and immune and cognitive development, among other pathologies. It is known that children with acute malnutrition have underdeveloped (immature) gut microbiomes, and current dietary interventions for malnutrition have no impact on this.

Using computational tools, researchers defined healthy microbiome development and its degree of impairment in Bangladeshi children with moderate and severe acute malnutrition. Then, using animal

models, they identified an affordable, culturally appropriate food formulation containing nutrients that increase numbers of under-represented growth-promoting microbiome constituents.

Treating malnourished children with this food repaired their microbiomes and increased levels of molecular indicators of growth toward a healthy state. HS

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## PUBLIC HEALTH

### The benefits of foot calluses

*Nature* **571**, 261-264 (2019)



Credit: Pikepicture / iStock / Getty Images Plus

Foot calluses protect feet while allowing sensory feedback that aids walking mechanics.

Shoes have only been widely affordable since the Industrial Revolution, and because they reduce the level of friction encountered by the soles of the feet, they prevent the formation of calluses.

To investigate the relative benefits of cushioned shoes as compared to calluses, researchers analyzed thickness, hardness and stiffness of calluses, along with foot sensitivity and walking kinetics, of individuals in Kenya and the US who ranged from not wearing shoes to wearing shoes every day.

They found that calluses protect feet while also allowing the perception of tactile stimuli and moderation of ground force. People who wear shoes have a resultant alteration in walking kinetics, whose health effects are unknown. HS

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## OBESEITY

### A beneficial inflammation

*Cell* **178**, 1-13 (2019)

A subset of macrophages infiltrate adipose tissue and regulate its expansion, alleviating symptoms of metabolic syndrome.

Immune cells are known to infiltrate white adipose tissue in obesity and contribute to systemic metabolic syndrome. However, the molecular signaling pathways that recruit and regulate the function of these cells has remained elusive.

A worldwide group of researchers identified a population of white adipose tissue macrophages that are stimulated in adipose tissue by the lipid receptor TREM2. The cells can prevent lipid overexpansion and alleviate metabolic syndrome in mice, and they correlate to obesity in humans, suggesting that they can be targeted in therapeutic approaches. HS

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