

## research highlights

### NUTRITION

#### Full dairy ahead!

*Lancet* **392**, 2288–2297 (2018)



Dietary guidelines recommend reduced dairy consumption to prevent heart disease, although evidence linking the two is scarce.

Dairy products such as milk and cheese include high levels of saturated fats, which are thought to increase blood lipid content and hence increase the risk of cardiovascular disease.

A global collaboration of researchers leveraged the data from the Prospective Urban Rural Epidemiology study, which includes data from individuals from 21 countries and 5 continents, to investigate the association between consumption of milk, cheese and yogurt and adverse cardiovascular events and mortality. They found that consumption of milk and yogurt was associated with a lower risk of these adverse events, whereas cheese consumption was statistically neutral. HS

<https://doi.org/10.1038/s41591-018-0331-0>

### AGING

#### Accumulating mutations

*Science* **362**, 911–917 (2018)

The epithelial cells of the esophagus accumulate somatic mutations during aging, and cancer-associated mutations are selected for.

It is known that cells accumulate mutations with age, but the extent to which this occurs and the relationship with cancer development are largely unknown.

Scientists in the United Kingdom sequenced esophageal epithelial tissue from nine individuals of varying ages. They found that by middle age the cells lining the esophagus carry an average of around 2,000 somatic mutations per cell. They also found that cancer-associated mutations were positively selected for. While most genes under selection were known drivers of esophageal squamous carcinoma, mutations in the *NOTCH1* gene were several times more common in normal esophagus than in esophageal cancers. HS

<https://doi.org/10.1038/s41591-018-0329-7>

### TECHNOLOGY

#### Local immune monitoring

*Sci. Transl. Med.* **10**, eaar2227 (2018)

A microneedle-based technology is a minimally invasive technique for monitoring immune responses directly in tissue.

Currently, systemic immune monitoring of individuals is carried out by blood draws. Localized monitoring of tissue-resident immunity can be assayed by delayed hypersensitivity tests, but these lack quantitative and phenotypic information regarding the local immune response.

Mandal et al. develop a microneedle-based technology for longitudinal sampling of cells from the skin, which takes the form of a porous matrix inserted into the skin allowing monitoring of skin tissue-resident memory T cells.

The technology could be used as a diagnostic in autoimmune disorders or to monitor responses to vaccines. HS

<https://doi.org/10.1038/s41591-018-0332-z>

### CYSTIC FIBROSIS

#### Combination therapy

*N. Engl. J. Med.* **379**, 1599–1611 (2018)

*N. Engl. J. Med.* **379**, 1612–1620 (2018)

A combination of therapies shows potential to treat up to 90% of individuals affected with cystic fibrosis.

Cystic fibrosis is caused by mutations in the membrane transporter cystic fibrosis transmembrane conductance regulator (CFTR). The common Phe508del mutation results in diminished amounts of protein at the cell surface and reduced efficiency of anion transport. The tezacaftor–VX-659 combination increases trafficking of mature CFTR to the cell surface, and ivacaftor augments the anion transport of mutant CFTR at the cell surface.

A group of researchers named the VX16-659-101 Study Group found that the combination of these therapies not only was effective at restoring Phe508del *in vitro*, but also shows substantial efficacy in individuals carrying one or two copies of Phe508del in a clinical trial, as measured by lung function, quality of life and sweat chloride, a marker of CFTR activity in patients. Very similar results were demonstrated with a related combination of medicines, VX-445–tezacaftor–ivacaftor. HS

<https://doi.org/10.1038/s41591-018-0328-8>

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### ETHICS

#### Investigating the moral machine

*Nature* **563**, 59–64 (2018)

Socially acceptable principles for machine ethics must take a cross-cultural approach.

Self-driving cars are under development and present a wealth of moral dilemmas with respect to mortalities caused by potential accidents.

Researchers from the Massachusetts Institute of Technology designed an online survey entitled the ‘Moral Machine,’ open to all. This survey presented dilemmas such as whether to sacrifice old versus young people or women versus men in accidents involving self-driving cars.

There were moral agreements worldwide; however, differences could be attributed to modern institutions and cultural traits. HS

<https://doi.org/10.1038/s41591-018-0330-1>