Previously, the liver was considered the primary site of sugar metabolism. But with the help of isotope tracers, a new study in C56BL/6 mice shows that, at low dietary doses, fructose doesn't reach the liver; instead, it's converted to glucose and other related metabolites in the small intestines. But as doses increase, the intestines can't keep up, leaving the liver, as well as bacteria in the colon, to handle the excess fructose. *EPN*

<https://doi.org/10.1038/s41684-018-0058-z>

PHENOTYPES

Not so simple

PLoS Genet. **13**, e1007075 (2017)

A particular mutation in a given gene doesn't always result in the same phenotype. Genes interact with each other as well as with the environment; without proper understanding of what those interactions are, assigning particular functions and predicting results can be fraught. A new study systematically analyzes how genetic background and the environment influence expression and complementation of alleles of the *scalloped* and *vestigial* genes that give shape to *Drosophila* wings. Different mutations were introduced to different genetic backgrounds, and flies were also reared at different temperatures. The results indicate that context matters: an array of different wing shapes were produced that varied with the different combinations tested, some more strongly than others. *EPN*

<https://doi.org/10.1038/s41684-018-0061-4>

SPINAL CORD INJURY

Mind around the gap

Nat Neurosci. **21**, 576–588 (2018)

In rodents, models of spinal cord injury (SCI) that involve carefully cutting the spine have revealed important pathways and improved understanding of how neurons can repair themselves post-injury. However, most spinal cord injuries in humans come from contusions, which inherently cause more widespread and indiscriminate

damage. Neuromodulation therapies with electrical stimulation have restored function to paralyzed limbs in cut SCI models in the past; a new paper demonstrates efficacy in a contusion model now as well.

The hind limbs of the rodents used in the study were completely paralyzed following a controlled impact to the lumbar spine. Neurons below the injury were electrically and/or pharmacologically stimulated, and the animals underwent two months physical therapy with a special harness to help bear their body weight. All animals that received both forms of stimulation regained use of their hind limbs. Even though the immediate neuronal projections at the contusion site remained damaged, alternative pathways from the brainstem were activated during the rehabilitation period. De-activating those signals inhibited recovery. *EPN*

<https://doi.org/10.1038/s41684-018-0060-5>

MICROBIOME

Oxidants as antibiotics

Nat Commun. **9**, 975 (2018)

Environmental stresses during development, such as exposure to reactive oxygen species (ROS), may lengthen life span. This effect has been attributed by some to upregulation of genes that encode antioxidant enzymes and stress response genes. Alex Gould of The Francis Crick Institute and colleagues exposed developing *Drosophila* to low doses of tert-butyl hydroperoxide (tBH), which increases ROS. The adults had longer lifespans, but they did not show any sign of heightened long-term adaptive stress response. Instead, the exposed animals had a greater proportion of *Lactobacillus plantarum* in their gut, and less of *Acetobacter aceti*. The former are linked to longer life and reduced reproductive success. The results suggest that tBH has a selective antibiotic effect on *A. aceti* in larval *Drosophila*. *JK*

<https://doi.org/10.1038/s41684-018-0059-y>

Jim Kling, Ellen P. Neff

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