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SPRINGER NATURE

WELFARE

A space evaluation

Sci. Rep. **8**, 713 (2018)

How much space does a lab mouse need? Guidelines exist, but empirical results are limited and often ambiguous. Jeremy Bailoo, Hanno Würbel and colleagues at the University of Bern in Switzerland recently investigated. Using a fully factorial design, the team tested combinations of sex (male and female), strain (C57BL/6ByJ and BALB/cByJ), floor area (370, 820, and 2400 cm²) and group size (3, 5, and 8 mice per cage) against a variety of welfare measures, including growth, stress physiology, emotionality, brain function, and home cage behavior. With the exception of male aggression, which was negatively impacted by increasing group size, the space allowances tested did not appear to have a significant impact on welfare-related outcomes, or at least the measures chosen for the current study. *EPN*

<https://doi.org/10.1038/s41684-018-0033-8>

IMAGING

Neuron holography

eLife **7**, e32671 (2018)

Technological advances have greatly improved imaging and control of neurons in the brain, but it's still a dense organ that is difficult to interrogate *in vivo* and in three dimensions. A new approach from Weijian Yang, Rafael Yuste and colleagues at Columbia University involves a holographic microscope with two independent two-photon lasers. One laser images activity in the brain, while the other can be used to optically activate specific neurons. Combined with calcium indicators, the microscope was able to photostimulate specific neurons deep in the visual cortex of awake mice and record volumetric images, while using less power than previous methods. *EPN*

<https://doi.org/10.1038/s41684-018-0036-5>

CANCER

Fish food & tumor growth

Biol. Open **7**, bio030726 (2018)

Zebrafish with *p53/BRAF* mutations are used to model melanoma, but it can take several weeks for tumors to develop. Prior research in other animals (including people) has suggested that diet can impact how quickly and aggressively melanomas form, so Charles Kaufman and his lab at

Washington University in St. Louis decided to conduct a simple experiment to test for such a link in their zebrafish models.

They sorted melanoma-prone adult zebrafish into three testing groups that received the same amount of food at each feeding event, but were fed either once, twice, or four times daily over the course of the study. Increased feeding increased the rate at which the team was able to detect tumor formation; the 4x-fed fish also had longer tumors at two snapshot points. In fish too, it seems diet makes a difference. *EPN*

<https://doi.org/10.1038/s41684-018-0034-7>

BIOLOGICAL TECHNIQUES

Pupils protecting sleep

Curr. Biol. **28**, 392–400.e3 (2018)

Pupil dilation can reflect arousal, vigilance level, emotions, and even choice preferences. But what about sleep? Lead author Daniel Huber of the University of Geneva and his colleagues wondered if pupil size reflects the state of the cortex, and whether changes in the pupil might affect sleep.

They combined electrophysiology measurements with pupil measurements in naturally sleeping mice, and found that pupil size could reliably predict whether the animal was in the rapid-eye movement (REM) stage, the non-REM stage, or awake. Constriction of the pupil might shield sleeping animals from visual stimuli that could awaken them. This idea was reinforced when researchers artificially dilated one pupil and found that light flashes directed towards it led to sleep state changes, but no changes occurred when flashes were directed to the pupil in the sleep state. *JK*

<https://doi.org/10.1038/s41684-018-0035-6>

IMMUNOLOGY

An antiviral STING

Cell Host Microbe **23**, 1–5 (2018)

Bats have a remarkable ability to host numerous viruses that plague people, without any apparent ill-effects. Taking a closer look at immune pathways in three different bat species, researchers from the Chinese Academy of Sciences and Duke-NUS Medical School recently identified a mutation in a highly conserved protein known as STING that is involved in the release of infection-fighting interferons to the presence of free-floating DNA. Viruses can contribute such DNA in animals, but so too can the metabolic demands of flight. The team observed that the signaling pathway is dampened