Multisensory neural integration of different stimuli for a better understanding of animal behavior

In article number 1700060, Juan Antonio Sánchez-Alcañiz and Richard Benton review and discuss the interplay of chemosensory and mechanosensory mechanisms in both vertebrates and invertebrates. While these modes of sensing the environment are usually investigated separately, recent research has shown that they often function together to control an animal’s behavior. In their review, the authors look at the various organizational levels involved in these processes: from the different sensory receptor families via neurons all the way to the central neural circuits and organs. This more holistic approach of integrating several stimuli will lead to a better understanding of how animals respond to environmental cues.

“Synthetic essentiality: A novel therapeutic approach to treat cancer?”

Di Zhao and Ronald A. DePinho discuss a novel conceptual approach called ‘synthetic essentiality’ (see article number 1700076). ‘Synthetic essential’ genes might be identified but also argue that they could present novel therapeutic targets.

Oxidative stress management in the hair follicle: Could targeting NHE2 counter age-related hair disorders and beyond?

Laura Jatkowskaite, Pierre A. Coutombre, Matthias Schäfer, Albena T. Dinkova-Kostova, Ralf Paus and Iain S. Haslam

Cancer adaptations: Atavism, de novo selection, or something in between?

Frédéric Thomas, Beata Ujvari, François Renaud and Mark Vincent

Phototoxicity in live fluorescence microscopy, and how to avoid it

Jaroslav Icha, Michael Weber, Jennifer C. Waters and Caren Norden

How to illuminate biological samples without causing (too much) damage

In article number 1700003, Jaroslav Icha et al. discuss the effects of phototoxicity in live fluorescence microscopy, illuminating living specimens with light may have negative consequences from causing damage to cellular macromolecules to sample death. This may lead to experimental artifacts and irreproducible data. In addition to these drastic consequences, the authors also look at more subtle — and more difficult to detect — manifestations of phototoxicity, such as limiting the illumination to the focal plane or reducing overall light exposure.

Synthetic essentiality: Targeting tumor suppressor deficiencies in cancer

Di Zhao and Ronald A. DePinho

The image on the cover is a schematic illustration of how two mutually nonexclusive theories: atavism (dating back to the pre-Cambrian period) and somatic evolution/convergent evolution can both contribute to explaining cancer evolution. In article 1700039, Thomas et al. discuss the criteria that should be applied to discriminate between the two competing theories, and propose potential applications of this conceptual framework in developing novel cancer treatment strategies. Original artwork by Eric Pelatan.