

# Science

## A revealing view of oxides

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Aging muscle doesn't waste away in active individuals.



## AGING

## Aging muscle: Use it or lose it

It is perhaps not muscle that disappears as we age, but our preference and capacity for exercise. Pollock *et al.* examined the vastus lateralis muscle (part of the quadriceps) in a set of about a hundred 55- to 79-year-olds who cycled more than 100 miles a week. They analyzed muscle fiber type, fiber size, adenosine triphosphatase activity, capillary density, and abundance of mitochondrial proteins. The one measured parameter that showed a statistically significant change with age was a decrease in capillary density. Thus, in this cohort of recreational distance cyclists, where sedentary behavior was taken out of the mix, there was little deterioration of muscle caused by inherent aging processes.

—LBR

*Aging Cell* 10.1111/ace.12735 (2018).

to developing diabetic kidney disease than other subgroups. Updating the diabetes classification may help predict and assist those patients at greatest risk for complications and improve personalized care. —PNK

*Lancet Diabetes Endocrinol.* 10.1016/S2213-8587(18)30051-2 (2018).

## CANCER

## Tumor-agnostic therapy gets on TRK

In precision oncology, treatment is tailored to match the specific mutations that drive tumor growth. To date, this targeted approach has emphasized highly recurrent mutations specific to certain tumor types—for example, the BRAF mutations that occur in about 40% of melanomas. This paradigm of tumor type-specific therapy is changing, however, with the recognition that diverse tumor types can share the same low-frequency mutations. Recent clinical work illustrates the promise of “tumor-agnostic” targeted therapy. Drilon *et al.* studied 55 patients with 17

distinct tumor types that harbored rare chromosomal fusions involving tropomyosin receptor kinase (TRK) genes. They found that larotrectinib, a TRK inhibitor, produced durable responses in about 70% of the patients, regardless of their tumor's tissue of origin. —PAK

*New Engl. J. Med.* 378, 731 (2018).

## MATERIALS SCIENCE

## A revealing view of oxides

Oxide layers provide a protective barrier coating for underlying metals, although, if damaged, they can accelerate underlying degradation such as corrosion in pitted areas or intergranular cracking. However, oxide layers often do not flow the same way as the underlying metal when stressed. Yang *et al.* used electron microscopy in an oxygen environment to probe the deformation of aluminum, a tricky problem because of the speed at which alumina forms. As two welded tips were pulled apart, the alumina showed liquid-like flow behavior that could match the movement of the underlying aluminum. At high deformation rates, where

fresh aluminum was exposed, the authors observed self-healing of the coating through the seamless coalescence of new oxide islands. —MSL

*Nano Lett.* 10.1021/acs.nanolett.8b00068 (2018).

## EDUCATION

## A balance between content and process

Process of science (POS) skills, such as communication, experimental design, and data analysis, are critical components of STEM (science, technology, engineering, and math) curricula. Balanced with teaching content, how much time should be spent on teaching POS, and which POS skills should be prioritized? Addis and Powell-Coffman surveyed faculty and students across six science disciplines on time allotted to POS and which POS skills were most important. Whereas students approved of time spent on POS, faculty found this same amount of time to be insufficient. Students and faculty agreed that the POS skills of problem-solving, critical

thinking, and communication were important but disagreed about several others, suggesting a disconnect in the way that these two groups define specific POS skills. Findings from this study will help inform future curriculum development. —MMc

*J. Coll. Sci. Teach.* 47, 72 (2018).

## PEROVSKITE MATERIALS

## Layers for red luminescence

Two-dimensional organic-inorganic perovskites differ from their three-dimensional counterparts by having a quantum well structure that can alter their luminescent properties. Typically, these materials are formed by replacing A-site cations such as cesium with larger organic cations. Nazarenko *et al.* found that lead halide with two smaller cations, formamide (FA) and guanidinium (G)—FAGPbI<sub>4</sub>—exhibited red photoluminescence at room temperature and was stable up to 255°C. The material is also photoconductive. —PDS

*J. Am. Chem. Soc.* 10.1021/jacs.8b00194 (2018).