

## ASTRONOMY

## Enriched Old Stars

Globular clusters, the oldest surviving stellar systems in galaxies, were for a long time thought to be composed of stars that formed simultaneously with the same initial chemical composition. However, multiple stellar populations with a range of chemical compositions have been observed over the last few years, hinting at a complex and prolonged history of star formation and chemical enrichment. To put constraints on models of globular cluster formation, Schiavon *et al.* studied the correlations between cluster mass and the mean stellar abundances of Fe, Mg, C, N, and Ca for 72 old globular clusters in the Andromeda galaxy—the nearest spiral galaxy to the Milky Way. They found a correlation between N abundance and cluster mass, implying that the chemical enrichment undergone by globular clusters is proportional to their masses. The absence of correlations between mass and Mg and Ca abundances rules out enrichment through explosive nucleosynthesis. — MJC

*Astrophys. J.* 776, L7 (2103).

ing. Damage occurs when metastatic tumor cells recruit pre-osteoclast cells to the bone and then induce their differentiation into mature bone-degrading cells, which results in the release of proteins from the bone matrix that promote tumor cell growth. In a study exploring the molecules controlling osteoclast differentiation in the cancer setting, Ell *et al.* have identified miRNAs (microRNAs are small noncoding RNAs that regulate gene expression) whose levels were consistently down- or up-regulated in differentiating osteoclasts. Treatment in a mouse model of metastatic breast cancer with two of the down-regulated miRNAs (miR-141 and miR-219) suppressed bone metastases, suggesting that these miRNAs may have therapeutic utility. The up-regulated miRNAs proved interesting for a different reason: Two of them (miR-16 and miR-378) were detected in the blood of tumor-bearing mice and correlated with metastatic burden, suggesting that they may be useful biomarkers of bone metastases. A preliminary assessment of blood samples from breast cancer patients supported this idea. — PAK

*Cancer Cell* 24, 542 (2013).

## MOLECULAR BIOLOGY

## Polycomb Promiscuity

Turning genes off when they are not needed is as important as turning them on when they are. The polycomb repressive complex 2 (PRC2) shuts down gene expression during development in multicellular eukaryotes, and aberrant regulation of it can contribute to cancer. PRC2 is recruited to repress specific genes via its interaction with long noncoding RNAs (lncRNAs) such as HOTAIR and RepA. Other evidence suggests that PRC2 can interact with very many RNAs, and Davidovich *et al.* have extended these latter observations to show that, in vitro, PRC2 can bind RNA promiscuously and with affinities similar to those of its specific interactions with HOTAIR and RepA. In an analysis of previously published data sets, they demonstrate that PRC2 can interact with both specific lncRNAs and with RNA transcripts from many highly expressed genes in vivo. Although many of the genes that PRC2 interacts with include repressive chromatin marks, as expected given its silencing activity, up to one-third contain only activating marks. The capacity to bind a variety of RNAs enables PRC2 to scan the chromatin of active genes for repressive marks, which would indicate that the genes have somehow escaped silencing, and to shut them down again. — GR

*Nat. Struct. Mol. Biol.* 20, 10.1038/nsmb.2679 (2013).

## EDUCATION

## When Neuroscience Guides Education

How do findings in neuroscience guide educational research and practice? In particular, does providing information about the neurobiology of learning to in-service teachers improve their pedagogy? Dubinsky *et al.* addressed these questions by organizing three sessions of BrainU, a summer professional development workshop designed by the Society for Neuroscience, where plasticity was the key neuroscience concept taught. It was expected that teachers would see themselves as capable of changing students' neural circuits and feel empowered by being able to explain why practice and application were needed to consolidate learning. BrainU provided inquiry-based activities that teachers could subsequently use with their students. A multiple-choice test given before and after the workshop showed that teachers' basic neuroscience knowledge improved. Two pedagogical quality tests given to teachers once they returned to their classrooms indicated that cognitive engagement among students and teachers improved. Thus, BrainU succeeded in motivating teachers to implement student-centered lessons, based

on the concept of plasticity, and in modeling best practice in inquiry pedagogy. This research raises the question of whether teaching the neurobiology of learning to preservice teachers is also efficient. — FB

*Edu. Researcher* 10.3102/0013189X13499403 (2013).

## CANCER

## Preserving Bones

The most common site of metastatic disease in women with advanced breast cancer is bone. These lesions are painful and can be debilitating.

