

## IN BRIEF

**▶ METABOLISM****Cholesterol promotes breast cancer growth**

High cholesterol is a risk factor for some breast cancers and is associated with reduced response to hormone therapy. 27-hydroxycholesterol (27HC) is a metabolite of cholesterol, and a recent study shows that it is specifically required for hormone-dependent growth and metastasis in a mouse model of breast cancer. Inhibiting cytochrome P450 oxidase (CYP27A1), the enzyme that converts cholesterol to 27HC, reduced tumour growth in these mice. Moreover, the authors showed that expression levels of CYP27A1 are correlated with tumour grade in humans. This molecule may represent a new therapeutic target for breast cancer treatment and prevention.

**ORIGINAL RESEARCH PAPER** Nelson, E. R. *et al.* 27-Hydroxycholesterol links hypercholesterolemia and breast cancer pathophysiology. *Science* **342**, 1094–1098 (2013)

**▶ EPIGENETICS****Senescent cells: poised for cancer**

A new study used whole-genome bisulphite sequencing to map the epigenome of senescent cells and to show that they have similar methylation marks to those in cancer cells. Aberrant methylation has been associated with tumorigenic changes in gene expression, such as silencing of tumour suppressors and constitutive activation of growth-promoting genes. Thus, the authors conclude that the similarities between the methylome of senescent cells and tumour cells is significant, as senescent cells that escape replicative senescence are genomically unstable and primed for transformation.

**ORIGINAL RESEARCH PAPER** Cruickshanks, H. A. *et al.* Senescent cells harbour features of the cancer epigenome. *Nature Cell Biol.* **15**, 1495–1506 (2013)

**▶ BIOMARKERS****TERT marks recurrence of urothelial cancer**

Kinde *et al.* have shown that mutations in the telomerase reverse transcriptase (*TERT*) gene, which have previously been associated with urothelial carcinomas, can serve as biomarkers for this disease. The authors sequenced *TERT* mutations in 76 histologically well-characterized noninvasive urothelial carcinomas of various grades and found that all grades strongly associated with *TERT* mutations, which can be detected in urine. Importantly, the same *TERT* mutations were found specifically in patients who suffered relapse, but not in patients who remained free of carcinoma, indicating that *TERT* mutations might be a particularly useful marker for recurrent disease.

**ORIGINAL RESEARCH PAPER** Kinde, I. *et al.* *TERT* promoter mutations occur early in urothelial neoplasia and are biomarkers of early disease and disease recurrence in urine. *Cancer Res.* <http://dx.doi.org/10.1158/0008-5472.CAN-13-2498> (2013)

**▶ MICROENVIRONMENT****Thermal stress in mice**

Standard temperatures in mouse housing units cause chronic mild stress in mice as they can induce the activation of thermogenesis in order to maintain normal body temperature. The authors dub this 'subthermoneutral' stress and show that it reduces the anticancer effects of the immune response, leading to increased tumour formation, growth and metastasis. This indicates that housing temperatures are a noteworthy confounding factor and must be considered in the design of future tumour studies with an immune component in mice.

**ORIGINAL RESEARCH PAPER** Kokolus, K. M. *et al.* Baseline tumor growth and immune control in laboratory mice are significantly influenced by subthermoneutral housing temperature. *Proc. Natl Acad. Sci. USA* <http://dx.doi.org/10.1073/pnas.1304291110> (2013)