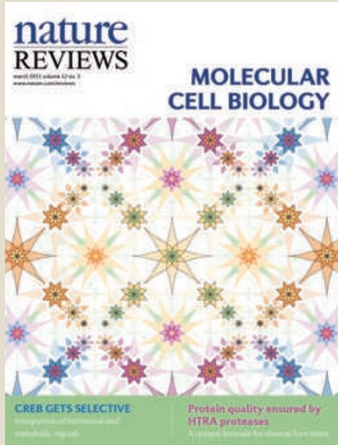




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► **COVER:** 'Dividing plants' by Vicky Summersby, inspired by the Review on p177.



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Cells have evolved mechanisms to protect themselves from internal and external insults to ensure that they can optimally carry out their biological functions. For example, cells continuously incur DNA damage from various sources. This activates the DNA damage response, which can lead to cell cycle arrest and DNA repair, or to elimination of the cell by apoptosis or senescence if the damage cannot be repaired. On page 198, Rossi and colleagues discuss the DNA damage response in stem cells. Although the aim is to maintain genomic integrity, they argue that the mechanisms by which stem cells respond to DNA damage may, in some cases, actually accelerate its accrual and affect the long-term function of these cells.

Cells also protect themselves by removing misfolded proteins, the accumulation of which could lead to the formation of toxic protein aggregates. To prevent this from happening, cells use chaperone proteins and proteases, which promote protein refolding or degradation. On page 152, Ehrmann and colleagues review the HTRA proteins, a family of highly conserved Ser proteases. They discuss how structural studies have revealed that HTRA proteases have a unique domain architecture that allows them to rapidly detect and respond to misfolded proteins.

Our understanding of the cellular machines that regulate these and other aspects of cell homeostasis ultimately requires the integration of information gained using different approaches. As part of our Series on Cytoskeletal motors, Veigel and Schmidt (page 163) discuss how, when used in conjunction with structural and molecular biology studies, single-molecule techniques such as atomic force microscopy and optical tweezers have revealed the mechanisms behind the power strokes, processive steps and forces of molecular motors.

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