



nature publishing group



► **COVER:** 'X-cats' by Vicky Summersby, inspired by the Review on p815.



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This issue features a Review by Jeannie T. Lee (page 815) to celebrate the golden anniversary of research on X-chromosome inactivation (XCI). Major progress has been made in the field following the first suggestion, 50 years ago, that one X chromosome in every female cell must be inactivated. Mary Lyon's findings led to the formulation of the 'dosage compensation hypothesis', which proposes that silencing of one of the two female X chromosomes allows gene dosages on the X chromosome to be balanced between males and females. The discovery of XCI has given valuable insights into many fields, as some of the mechanisms that inactivate X chromosomes, such as regulatory networks of non-coding RNAs, are thought to be active on a genome-wide scale. For example, studies on XCI functionally characterized non-coding RNAs that act as regulators of Polycomb group (PcG) proteins, which contribute to XCI.

PcG proteins and their counteracting Trithorax group (TrxG) proteins function to maintain the 'memory' of a transcriptional state. On page 799, Cavalli and colleagues describe the diverse roles of TrxG proteins. Through their ability to methylate histones and remodel chromatin, TrxG proteins help to maintain active chromatin states and therefore have a role in several processes, including tumorigenesis, embryonic stem cell self-renewal, cell fate choice and proliferation.

We are also pleased to continue our Post-translational modifications series with a Review from Janke and Bulinski (page 773), which describes how microtubules can be modified by a range of post-translational modifications. These modifications, and our understanding of the enzymes that regulate them, have given insight into how microtubules can achieve a wide range of biochemical and cellular functions.

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