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At the end of last year, the Nobel Prize in Chemistry was awarded to Aaron Ciechanover, Avram Hershko and Irwin Rose for their role in the discovery of a system for regulated protein degradation — the ubiquitin–proteasome system. Protein ubiquitylation is a well-established signal for protein degradation. However, ubiquitin conjugation can be used for many other purposes, and there are many ubiquitin-like proteins that control the activities of proteins. In a Review on page 599, Rebecca L. Welchman, Colin Gordon and R. John Mayer survey what is known about the non-degradative functions of ubiquitin and ubiquitin-like proteins in cell physiology. These ‘ubiquitons’, as they are collectively known, have roles in processes as diverse as DNA repair, transcription, endocytosis and signalling.

Accompanying this month's issue is a linked poster on ubiquitin and ubiquitin-like proteins by Rebecca L. Welchman, Tim Soane, Paul W. Sheppard and R. John Mayer. This poster provides information on ubiquitin nomenclature, sequence identity, functions and more. It has been produced with the generous support of BIOMOL International, L.P. and, as a result, it will be freely available online until the end of January 2006 (<http://www.nature.com/nrm/poster/ubiquitin>).

Looking downstream of ubiquitylation, Linda Hicke, Heidi L. Schubert and Christopher P. Hill review ubiquitin-binding domains on page 610. These recently discovered motifs bind to ubiquitin non-covalently, and interpret and transmit information that is conferred by protein ubiquitylation to control various cellular events. Understanding how their binding specificity is determined, how ubiquitin binding is regulated and the function of ubiquitin-binding domains in the context of full-length proteins will help us to understand how ubiquitin regulates cellular proteins and processes.



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