Ubiquitin chains

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Ubiquitin Enzymes

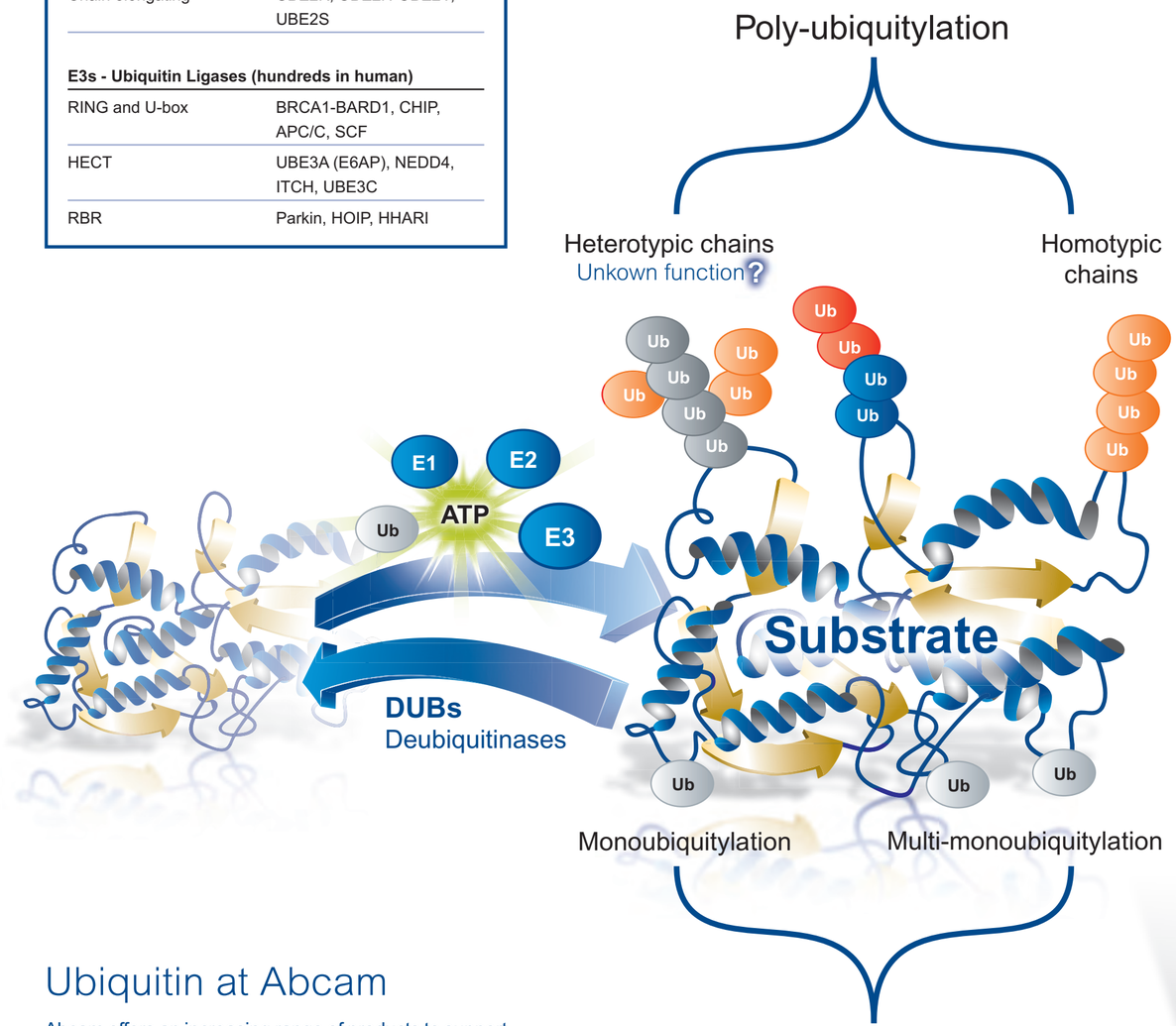
E1s - Ubiquitin Activating Enzymes (2 in humans)	
Enzymes	UBA1, UBA6

E2s - Ubiquitin Conjugating Enzymes (28 in humans)	
Monoubiquitylating	UBE2T, UBE2W
Chain initiating	UBE2C, UBE2D
Chain elongating	UBE2K, UBE2N-UBE2V, UBE2S

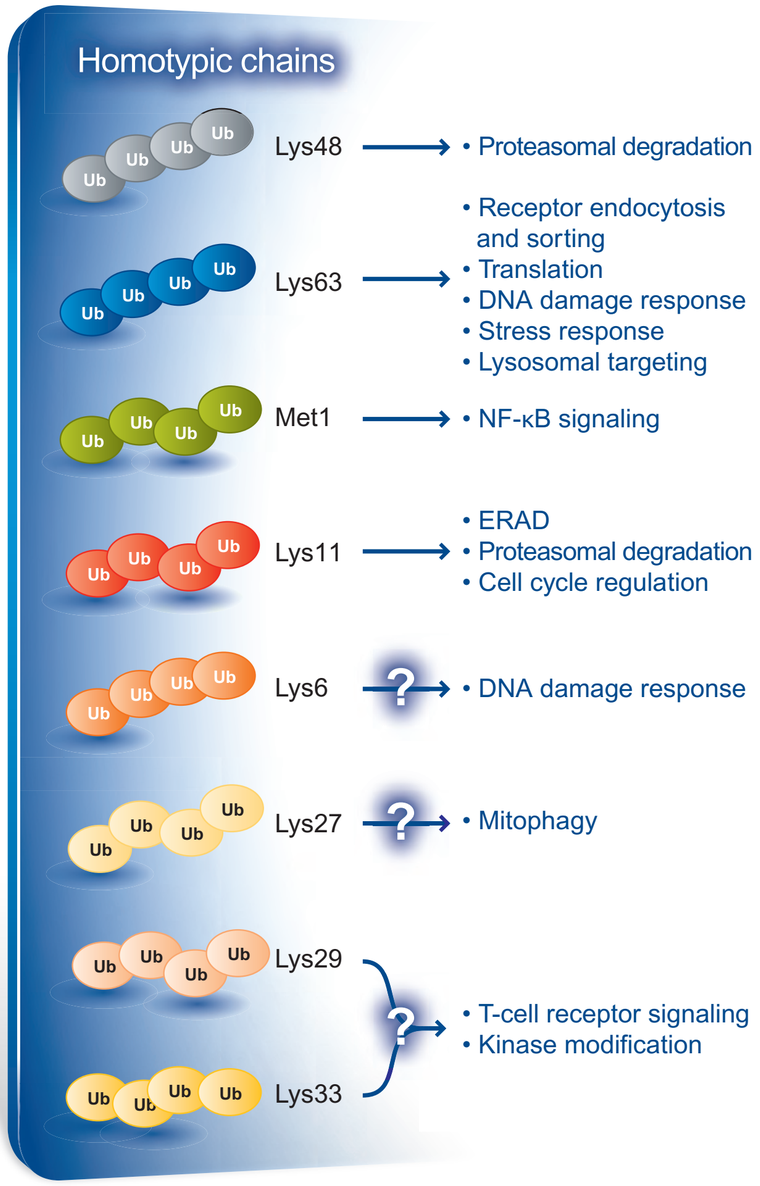
E3s - Ubiquitin Ligases (hundreds in human)	
RING and U-box	BRCA1-BARD1, CHIP, APC/C, SCF
HECT	UBE3A (E6AP), NEDD4, ITCH, UBE3C
RBR	Parkin, HOIP, HHARI

Ubiquitin Signaling

Protein ubiquitylation is a post-translatinal modification in which ubiquitin is covalently attached to target proteins either as a single entity or as chains via an enzymatic cascade comprising E1s, E2s and E3s. Polyubiquitin chains have different structure and regulatory functions depending on the ubiquitin residues they are linked through. Ubiquitylated substrates are recognized by proteins containing ubiquitin binding domains (UBDs), and deubiquitinases (DUBs) reverse this modification. This poster was created by Abcam in association with David Komander (LMB, Cambridge, UK) and Yaron Galanty (Gurdon Institute, Cambridge, UK).



- Lysosomal targeting
- Endocytosis
- Meiosis
- Chromatin remodeling
- DNA damage response



Ubiquitin Binding Domains (UBDs)

Alpha-helix fold	Example proteins
UIM	Vps27, RAP80, EPS15
IUIM (MIU)	RABEX5, RNF168
DUIM	HRS
UBM	Polι , REV1
UBAN	NEMO, ABIN1-ABIN3
UBA	RAD23A, NBR1, p62
GAT	GGA3, TOM1
CUE	TAB2, TAB3
VHS	STAM, GGA3

Zinc Finger fold	Example proteins
UBZ	Polη, Polκ, Tax1BP1
NZF	NPL4, TAB2, TAB3
ZnF A20	RABEX5, A20
ZnF UBP (PAZ)	USP5, HDAC6

Ph fold	Example proteins
PRU	RPN16
GLUE	Vps36

Ubc-like fold	Example proteins
UEV	UBE2V1, UBE2V2
UBC	UBE2D3

Other	Example proteins
SH3	Sla1, CIN85/SH3KBP1
PFU	Ufd3/Doa1
Jab1/MPN	Prp8

Ubiquitin at Abcam

Abcam offers an increasing range of products to support Ubiquitin and Ubiquitin-like molecules (UBLs) research including Ubiquitin proteins, Ubiquitin activating enzymes (E1s), Ubiquitin conjugating enzymes (E2s), Ubiquitin ligases (E3s), Deubiquitinases, as well as other UBLs related reagents and antibodies. Check out the latest products, promotions and meetings on our website.

References:

Kulathu, Y. & Komander, D. Atypical ubiquitylation - the unexplored world of polyubiquitin beyond Lys48 and Lys63 linkages. *Nat Rev Mol Cell Biol.* **13:508-23 (2012).**

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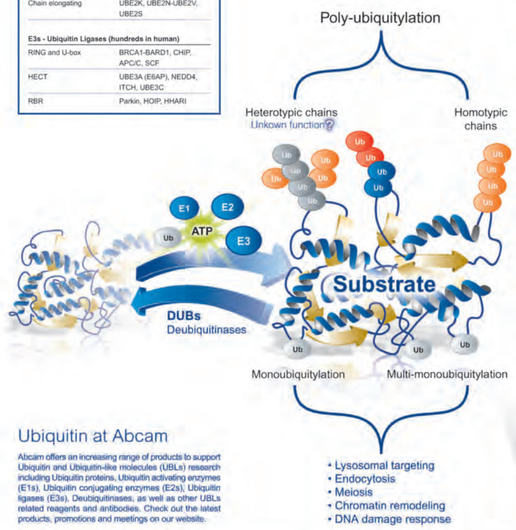

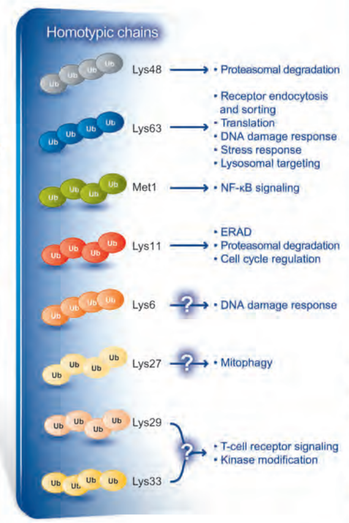

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