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IN BRIEF

CHROMATIN

HP1 locked up

Pericentric heterochromatin is marked by heterochromatin protein 1 (HP1), which is recruited to these regions by trimethylated Lys9 of histone H3 (H3K9me3); however it has been suggested that this modification is not the sole requirement for stable HP1 enrichment. In this study, Romeo *et al.* show in mouse cells that the SUMO protease SENP7 contains a double PXVXL (Pro-X-Val-X-Leu) motif module that mediates its interaction with HP1, independent of its ability to de-SUMOylate HP1. Furthermore, they report that this interaction motif maintains HP1 accumulation at pericentric domains and restricts HP1 mobility. On the basis of their findings, the authors propose a model whereby the SENP7 module locks several HP1 molecules to H3K9me3-modified nucleosomes.

ORIGINAL RESEARCH PAPER Romeo, K. *et al.* The SENP7 SUMO-protease presents a module of two HP1 interaction motifs that locks HP1 protein at pericentric heterochromatin. *Cell Rep.* http://dx.doi.org/10.1016/j.celrep.2015.01.004 (2015)

CELL SIGNALLING

Orphan receptor finds ligand

Signalling through the tyrosine receptor kinase ALK (anaplastic lymphoma kinase) is important in development, and aberrant ALK activation has been implicated in several cancers. Although it has been suggested that two heparin-binding extracellular proteins (pleiotrophin and midkine) activate this receptor, the identity of its ligand or ligands is unclear. Murray *et. al.* now show that heparin stimulates ALK autophosphorylation in neuroblastoma cells, but this is independent of pleiotrophin and midkine. Indeed, heparin bound to the ALK extracellular domain with high specificity and affinity. Furthermore, whereas short heparin chains bound ALK in a monomeric manner and did not activate it, heparin chains above a specific length promoted ALK dimerization, autophosphorylation and thus activation. Finally, the authors generated antibodies that blocked heparin-mediated ALK activation; this may lead to a novel therapeutic approach.

ORIGINAL RESEARCH PAPER Murray, P. B. *et. al.* Heparin is an activating ligand of the orphan receptor tyrosine kinase ALK. *Sci. Signal.* **8**, ra631 (2015)

EXTRACELLULAR MATRIX

Collagen directs invadopodia

Tumour cells can harbour invadopodia (actin-rich protrusions that degrade extracellular matrix components to drive cell invasion). Artym *et. al.* devised a new system for studying invadopodia formation, which is based on high-density fibrillar collagen (HDFC) and mimics *in vivo* cancer environments, and found that HDFC induces the formation of ECM-degrading invadopodia in tumour cells. Mechanistically, α2β1 integrin was required for HDFC-induced invadopodia formation in breast carcinoma cells although, surprisingly, no changes in gene or protein expression were observed. However, the formation of HDFC-induced invadopodia required a different integrin signalling network to that of invadopodia induced by gelatin (an established system for studying them). Notably, phosphorylation of the integrin activator kindlin 2 as well as downstream signalling were crucial for the formation of invadopodia in cells grown on HDFC but not gelatin. Thus, HDFC activates kindlin 2 to induce invadopodia formation.

ORIGINAL RESEARCH PAPER Artym, V. V. *et al.* Dense fibrillar collagen is a potent inducer of invadopodia via a specific signaling network. *J. Cell Biol.* **208**, 331–350 (2015)