McGill UNIVERSITY

Department of Anatomy & Cell Biology

"Dynamic crosstalk between ubiquitin-like modifiers unraveled by quantitative proteomics"

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The small ubiquitin modifier (SUMO) is an ubiquitin-like (UBL) protein that is reversibly conjugated to a wide range of substrates involved in different regulatory pathways including intracellular trafficking, DNA damage response and cell cycle progression. Crosstalks between protein SUMOylation, phosphorylation and ubiquitination have recently been reported although no approach currently exists to determine the inter relationship between these modifications. We developed a novel immunoaffinity method that permits the study of both protein ubiquitylation and SUMOylation from a single sample. This method enables the unprecedented identification of 10,388 SUMO sites from human cells. Quantitative proteomic analyses reveals crosstalk between substrates that control protein degradation, and highlights co-regulation of SUMOylation and ubiquitylation levels on deubiquitinase enzymes and the SUMOylation of proteasome subunits. We also identified several SUMOylated substrates associated with PML nuclear bodies that were significantly regulated during cell senescence, including the sole SUMO E2 enzyme UBC9. These findings will be discussed in light of the well-known association between UBC9 expression and cancer.

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Strathcona Anatomy Building
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