Rationally designed Golgi binders for organelle-directed proteomics

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Abstract

The Golgi complex's role in development remains poorly understood. In human embryonic stem cells, three Golgi proteins are among the eleven genes required to exit pluripotency, yet their function in this transition is unclear. Golgi activities like signalling and secretion influence stem cell states, and stem cells express a limited set of Golgi trafficking factors, suggesting a simpler secretome than differentiated cells. These experimental observations indicate that that the Golgi plays a role in cell differentiation and development, and that this role reflects a functional remodelling based in the changes of its trafficking and enzymatic machineries.

This project will analyse Golgi dynamics in sea urchin embryos using rationally designed Golgi binders: affinity reagents that enable rapid, one-step purification of Golgi complexes from homogenates for mass spectrometry. These binders are based on a short protein region selectively recruited by Golgi membranes, offering a powerful tool for proteomic studies. The project combines cell/developmental biology, biochemistry, and recombinant protein design and production to elucidate how remodelling of the Golgi machinery contributes to animal development.