הפקולטה לכימיה
ע"ש שוליך
טכניון – מכון טכנולוגי לישראל

Faculty of Chemistry
SCHULICH
Technion, Israel Institute of Technology

The Laboratory for Organic and Inorganic Chemistry

Final MSc Seminar

Sunday, July 7th at 9:30 in Hall 1

Ms. Dana Shkolnik

Brik Group

On the Topic of:

Chemical Synthesis of SUMO Probes for Biochemical and Functional Analyses

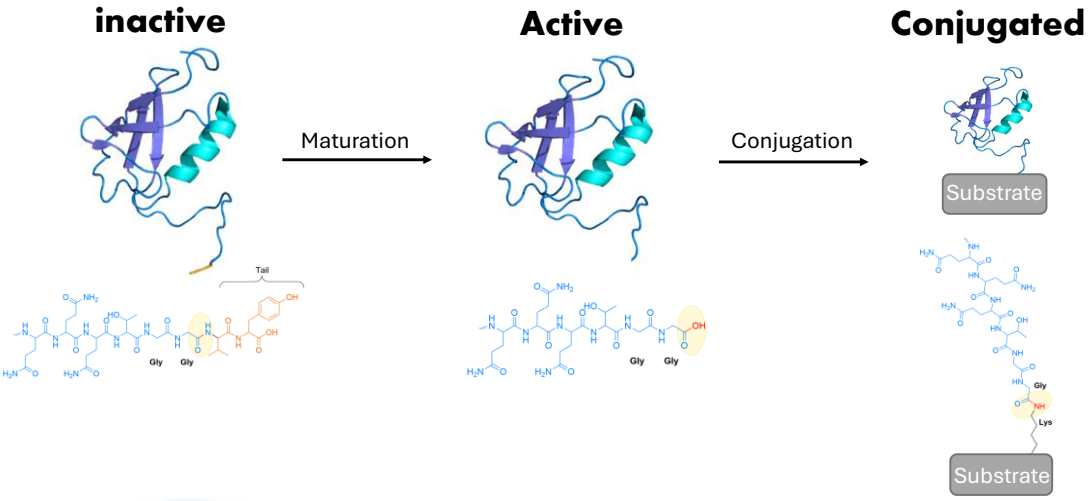
Technion City, Haifa 3200003, Israel
קריית הטכניון, 3200003, חיפה

Chemical Synthesis of SUMO Probes for Biochemical and Functional Analyses

SUMOylation is an essential post-translational modification present in all eukaryotic cells, where a small ubiquitin-related modifier (SUMO) protein is covalently and reversibly attached to a lysine residue of a target protein. SUMO has diverse biological functions in various cellular pathways such as DNA repair, cell proliferation, infection, and many other crucial processes. The first step in the SUMO cycle, which is vital for SUMO activity as a modifier, is called the maturation step. During this step, a group of enzymes cleaves the SUMO tail via a hydrolysis reaction, converting SUMO from its inactive precursor to its active form. This activation facilitates the conjugation of SUMO to its target proteins (Scheme 1). Although extensive studies have been done to understand SUMO's biological function, the maturation process is less addressed.

In our research, we combined two main methods, chemical protein synthesis and bead loading technique to deliver our synthetic proteins into live cells. Chemical protein synthesis offers several advantages in the endeavor of studying the cellular behavior of SUMO including incorporation of unnatural elements, performing a site-specific modification, synthesizing different probes, and more.

In this seminar, I will present the chemical synthesis of diverse SUMO probes that are assisting us to gain new insights into the maturation process of SUMO in live cells.



Scheme 1. The maturation step initiates the SUMO cycle. The SUMO2 tail (comprising VY amino acids) is colored orange.