TECHNOLOGY

Simplified Synthesis of Polyubiquitin Chains

OVERVIEW

Background

Ubiquitin is an important protein involved in the post-translational modification and trafficking of other cellular proteins. After attaching a single ubiquitin monomer to a protein, cells use the formation of polyubiquitin chains (attaching more ubiquitin to the initial monomer) to direct if the protein should be inserted into the membrane, moved to the proteasome for degradation, or directed elsewhere in the cell. By having multiple residues where ubiquitin monomers can be joined, cells can direct proteins to a variety of intracellular processes by only using ubiquitin chains. However, this diversity of chaining can make the study of the ubiquitin process difficult, as slight changes in the chain can have profound changes in the cellular trafficking signal it produces. Currently, methods for synthesizing polyubiquitin chains require advanced chemistry techniques, which are costly and time consuming. These techniques also have limited control over the linkage points of each monomer in the chain and cannot incorporate radioisotopes for the use in NMR. Therefore, additional methods for the synthesis of specific polyubiquitin chains are needed in research.

Innovative Technology

Researchers at the University of Maryland have developed a cost-effective way to synthesis both straight and branched polyubiquitin chains. This process allows for the linking of ubiquitin monomers at specific lysine residues, allowing for the controlled synthesis of ubiquitin chains in native conformations. This control allows for the targeted studying of specific ubiquitin enzymes and the effects of specific ubiquitin chains on cellular trafficking.

APPLICATIONS

· Cellular and molecular research

ADVANTAGES

· Can synthesize straight and branched ubiquitin chains with control over linkage points for ubiquitin monomers
· Ability to incorporate radioactive isotopes for NMR studies

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CATEGORIES

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EXTERNAL RESOURCES

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