

Submission Date: May/22/2024

2023 Academic Year Bio-SPMs Collaborative Research Research Report Summary

Title of the research project		The study of insect chitin synthase on single molecule level using HS AFM	
PI (Person in charge of the research project)	Name	Mingbo Qu	
	Affiliated Institution and Department/Division/etc.	School of Bioengineering, Lab of Biomolecular Target, Dalian University of Technology	
	Position	Associate professor	
Bio-SPMs that you used (Check the boxes)		<input type="checkbox"/>	Atomic resolution/3D-AFM
		<input checked="" type="checkbox"/>	High-speed AFM
		<input type="checkbox"/>	SICM
		<input type="checkbox"/>	AFM for Cell Measurement
Collaborative NanoLSI Faculty Members		Toshio Ando	
<p>Describe the summary of the research project</p> <p>Chitin is a crucial structure component for fungi and insects. The enzymes involved in chitin metabolism are potential targets for designing eco-friendly pesticides, including chitin synthase (CHS), chitinase, and lytic polysaccharide monooxygenases (LPMO). Understanding their catalytic mechanism is crucial for their application as targets. Here we applied HS-AFM to investigate the catalytic mechanism of CHS on a single molecule level.</p> <p>During this research period, the conditions for observing the membrane protein chitin synthase PsCHSA were optimized. After trying different conditions, we were able to observe the elongation process of the chitin chain produced by PsCHSA, but the dynamic changes of the enzyme could not be observed so far. Based on the data obtained so far, the catalytic speed of PsCHSA could be estimated. It may also provide some clues about how the newly synthesized chitin chains were assembled.</p>			

*This form (Form 3) will be open on the NanoLSI website in the following academic year.

*Note that this form should be prepared in one A4-size paper.

*Submission Deadline: May 10, 2024 (Friday). **Submit it as a PDF file.**

*Submission Destination: the person in charge of Bio-SPMs collaborative research at WPI-NanoLSI, Kanazawa University

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