

Submission Date: 05/07/2020

2019 Academic Year Bio-SPMs Collaborative Research Research Report Summary

Title of the research project		High speed AFM observation of dynamic interactions of <i>Bacillus</i> lipopeptides with <i>Corynespora cassiicola</i> toxin, cassiicolin, on artificial lipid membranes	
PI (Person in charge of the research project)	Name	Nguyen Bao Quoc	
	Affiliated Institution and Department/Division/etc.	Research Institute for Biotechnology and Environment Nong Lam University	
	Position	Associate Professor	
Bio-SPMs that you used (Check the boxes)		<input type="checkbox"/>	Super-resolution AFM (FM-AFM/3D-AFM)
		<input checked="" type="checkbox"/>	High-speed AFM
		<input type="checkbox"/>	SICM
Collaborative NanoLSI Faculty Members		Dr.Ngo Xuan Kien	
<p>Describe the summary of the research project</p> <p>The aims of BIO-SPM FY2019 research collaborative are (i) HS-AFM imaging of the binding of <i>Bacillus</i> lipopeptide, iturin A (ituA) to different lipid membranes in yeast, bacterial, plant and other synthetic lipids (ii) HS-AFM imaging of the binding of cassiicolin toxins like cas1 and cas2 to different lipid membranes in yeast, bacterial, plant and other synthetic lipids (iii) HS-AFM imaging of the binding of ituA/cas and cas/ituA complexes to different lipid membranes in yeast, bacterial, plant and other synthetic lipids (iv) Characterizing biological roles of ituA against fungal pathogens as biocontrol agent</p> <p>As expected, the results obtained in this study indicated that ituA can bind and disrupt yeast lipid membrane but not in other synthetic lipid membrane by using HS-AFM suggesting the specificity of ituA against fungal pathogens. In addition, we also understand how cassiicolin toxins secreted by <i>Corynespora cassiicola</i> attack on the lipid membrane of plant during the infection. Interestingly, the dynamics of interaction between ituA and cas toxins were also demonstrated systemically on various lipid membrane compositions providing a deeply understanding on “selective disruption activities of ItuA lipopeptide on lipid membranes of <i>Corynespora cassiicola</i> producing Cas2 toxin causing <i>Corynespora</i> Leaf Fall (CLF) disease in rubber trees”. Further studies should be done for comparative analysis of other <i>Bacillus</i> lipopeptides on many synthetic lipid membrane and their interaction of various cassiicolins toxins from cas1 to cas6.</p> <p>BIO-SPM like HS-AFM is one of innovative tools for imaging the interaction between <i>Bacillus</i> lipopeptide and cassiicolin toxin on artificial lipid surfaces for understanding their structural dynamics and functions as a biological control agent. Our results are now under preparation for publication.</p>			