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Expression and Purification of HFB1 from the Bacterial host *Escherichia Coli*

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Abstract

Hydrophobins are a unique class of proteins which grow in fungi which demonstrate unique properties, such as self-assembly into two dimensional arrays at water/air or water/solid interfaces. A specific type of hydrophobins, HFB1, will be closely examined, expressed, and purified within an *e. coli* host. Most hydrophobins are used within the medical field and are harvested directly from the fungi, with little research done to express the protein within a bacterial host for large scale production. Our research will revolve around developing a method to clone, express, and purify the hydrophobin, HFB1, within the bacterial host, with tweaking of the methods as problems and solutions arrive. The HFB1 developed will be used as a novel nanomaterial, with some applications being the removal of oil from water, or tissue-culture cell growth.

Research Question

What changes must be made to express and purify the protein HFB1 in the most efficient way possible?

Importance

- Hydrophobins' unique properties of self-assembly.
- *E. coli*. is used as a bacterial host to produce the HFB1 faster; within one day.

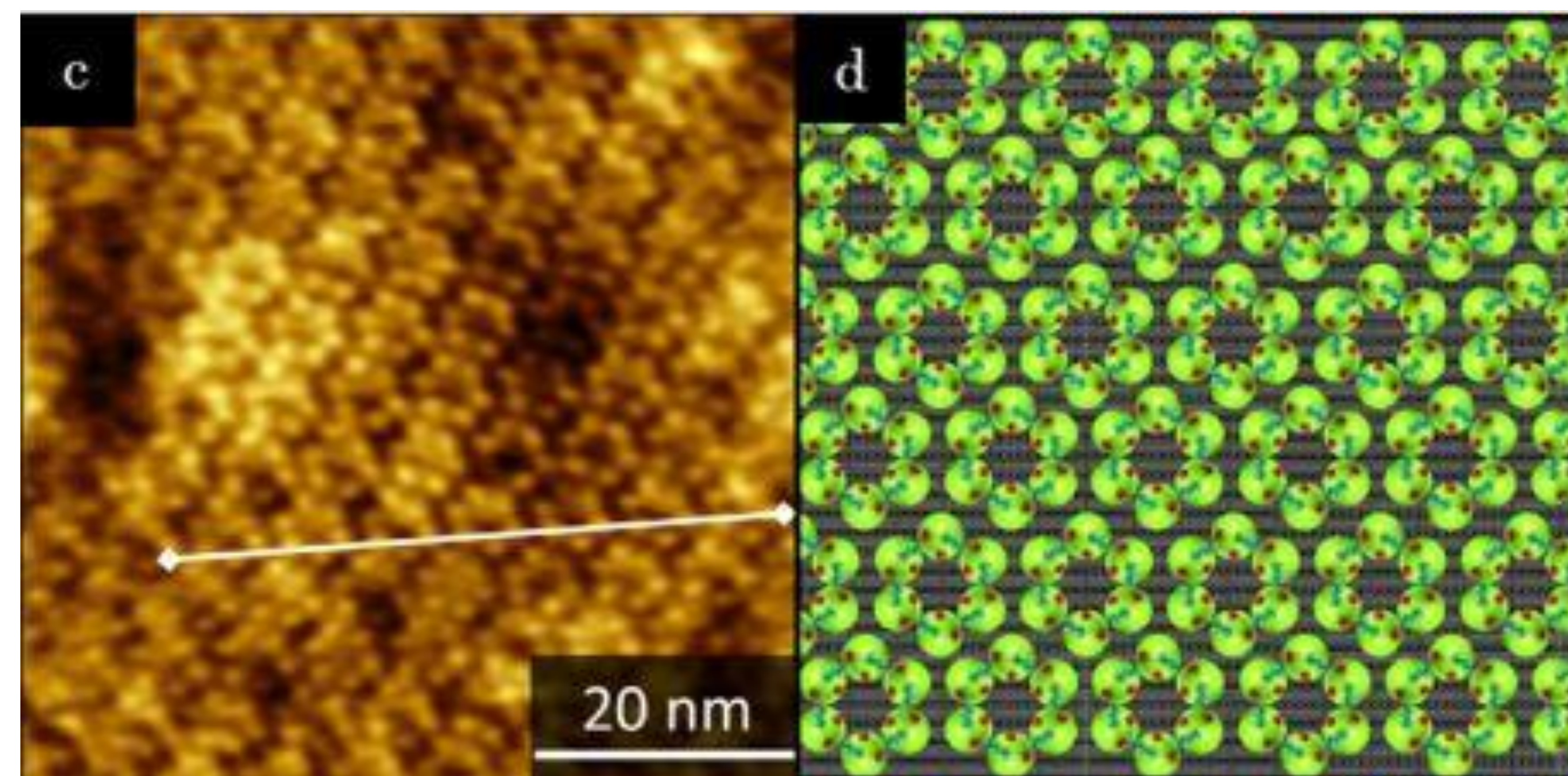


Figure 1: Image showing self assembly of HFB1

Implications and Applications

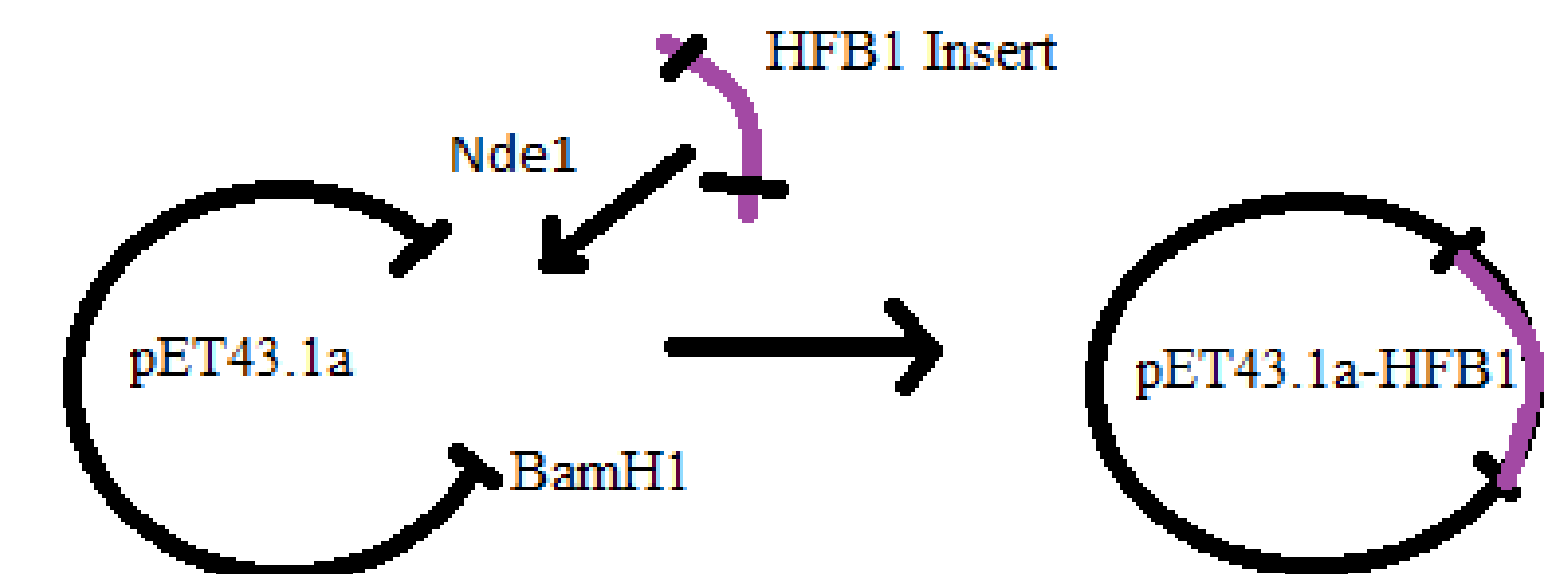
- Faster and more efficient production of HFB1 outside of fungal host
- Use within nanotechnology as a coating
- Stabilization of poorly water soluble drugs
- Expanding use of hydrophobin production and implementation

Methods

General cloning of the HFB1 into bacterial vector are as follows:

- Preparation of Vector DNA
- Cloning DNA that expresses HFB1
- Creation of circular plasmid DNA

Scheme of Cloning



Future Work

- Transformation of the plasmid DNA into *e. coli* cells
- Expression and purification of HFB1

References

Yamasaki, R., Takatsuji, Y., Asakawa, H., Fukuma, T., & Haruyama, T. (2015). Flattened-Top Domical Water Drops Formed through Self-Organization of Hydrophobin Membranes: A Structural and Mechanistic Study Using Atomic Force Microscopy. *ACS Nano*, 10(1), 81-87. doi:10.1021/acsnano.5b04049