# *B. subtilis* Recombinant Protein Expression

**Grade Level:** **11 & 12 Summer Intern**

**Subject:** **Biotechnology / Molecular Biology/ Techniques**

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| **Overview & Purpose** | **Education Standards Addressed** |
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| Induce expression of target gene products for analysis.. | |

| | **Teacher Guide** | **Student Guide** | |
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| **Objectives**<br>(Specify skills/information that will be learned.) | Basic over view of recombinant protein expression systems. Biology of the pHT43 / *B. subtilis* expression system. Analysis. | Implement and induce recombinant protein expression and SDS-PAGE analysis. | **Materials Needed**<br>• Expression System<br>• Media<br>• 37 Incubator<br>• spectrometer<br>• SDS-Loading Buffer |
| **Information**<br>(Give and/or demonstrate necessary information) | Lac operon and gene expression. Predict size of target gene product. Amino acid analysis. | Basics of inducing target gene expression. Expectations of where gene product is found. Basic chemistry of gene product. | |
| **Verification**<br>(Steps to check for student understanding) | Follow growth using spectrometer. Follow recombinant protein expression by taking samples for SDS-PAGE. | Setup cultures and induce at appropriate OD. Prepare samples for SDS-PAGE. Predict target gene product molecular weight and amino acid composition. | **Other Resources**<br>(e.g. Web, books, etc.)<br>Short Protocols in Molecular Biology |
| **Activity**<br>(Describe the independent activity to reinforce this lesson) | .Discuss bio-assays. Basic variables used to characterize enzyme activity. | Develop a bioassay for the amylase fusion enzyme. | |
| **Summary** | Basic bread & butter molecular biology. Use expression system to produce target gene products for characterization. | Understanding the molecular biology of an expression system. | **Additional Notes** |