Crystal Characterization

Enzyme Crystallization & Diffraction

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Overview

• Project Description
  – Objectives

• Project Methodology
  – Crystal Growth & Characterization

• Key Findings / Results
  – Findings
  – Results

• Conclusion
Project Description

Objective

• Learn to handle biological samples
• Grow enzyme crystals
• Optically characterize crystals
• Vary growth conditions
• Flash-cool crystals
• Diffract crystals using x-rays
• Record and analyze results
Procedures

- Prepare enzyme solutions
- Prepare crystal plates
- Observe crystals under microscope
- Vary concentration and drop size
- Record results
- Flash-cool crystals in liquid nitrogen
- Diffract crystals with x-ray radiation

Key Assumptions
- *Crystal quality changes with conditions*
Procedure: Enzyme Preparation

- Learn to handle biological samples
- Prepare buffer solutions
- Weigh correct amount of enzyme
- Dissolve enzyme in buffer solution
Procedure: Crystal Plate

- “Grease” crystal plates
- Clean the cover slips
- Dispense well solutions
- Dispense enzyme on cover slips
- Set-up the cover slips
- Store at appropriate temperature
Procedure: Observation

- Examine wells under microscope
- Record “clear” and “crystal” conditions
- Capture images of crystals
- Modify conditions
- Set-up next batch of plates
- Store at appropriate temperature
Procedure: Flash-Cool

- Learn about cryo conditions
- Safe handling of liquid nitrogen
- Retrieve a good crystal
- Flash-cool with liquid/gas nitrogen
- Store at cryo temperature
Procedure: Diffraction

• Learn about diffraction
• Safety of x-ray radiation
• Mount a good crystal
• Record a diffraction pattern
• Analyze and note the results
Conclusion
Questions & Discussion