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Protein Crystallization of HIV Protease Wildtype 113A

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Title: Protein Crystallization of HIV Protease Wildtype 113A

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Introduction: Human Immunodeficiency Virus is a virus in a league of its because of how advanced it is. HIV protease is a retroviral protease that is essential for the life-cycle of HIV, and this makes it a common target for medication synthesized to fight the virus. In order for a medication's effectiveness and mechanistic activity to be found it has to first be crystallized. This can be achieved through protein crystallization methods, and after viable crystals are formed they can then be x-ray diffracted in order to reveal an electron cloud structure.

Purpose: If Protease Wildtype 113A is crystallized then its electron cloud structure can be revealed via x-ray diffraction. Once its electron cloud structure is found then a mechanism of its activity in inhibiting HIV can be assessed. This will then allow for its effectiveness to be graded and essentially send the Wildtype on to the trial phase of testing.

Method: The hang drop protein method was used to crystallize this protease. This method involves making various well solutions with specific solvents, buffers, and the correct pH. A drop of the Protease and the solvent are allowed to equilibrate in a closed well system for a few days until a crystal forms. The method takes a lot of repetition order to yield optimal crystals, but once the correct conditions are found then the crystals can be amplified then extracted to be sent off for x-ray diffraction.

Results: HIV Protease Wildtype 113A yielded viable crystals that were then x-ray diffracted. The resolution of the Wildtype came out to be about 1.6 Angstroms. This is an excellent resolution.

Conclusion: Through x-ray diffraction an electron cloud was produced. This electron cloud will now be analyzed in order to reveal what the specific atomic makeup of the Protease Wildtype 113A. A model will then be produced that will allow for the exact characterization of the protease to be revealed. Once all of the key features of the Wildtype are discovered then a decision will be made on whether it will continue on to the trial phase.

Recommendations: The field of protein crystallization is making great leaps into controlling the activity of HIV. Through this research it may be possible to one day find a cure for this ferocious disease.