



SMART Teams 2013-2014

Research and Design Phase

Marquette University High School SMART Team

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The Silent Assassin

PDB: 1C8M

Primary Citation: Chakravarty, S., Batorck C. M., Pevear, D.C., Diana, G.D. and Rossnamm, M.G. (2000). The refined structure of a picornavirus inhibitor currently in clinical trials, when complexed with human rhinovirus 16. *To be published.*

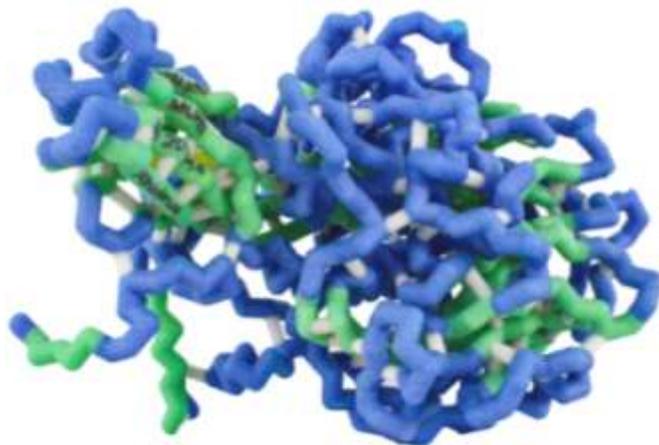
Format: Alpha carbon backbone

RP: Zcorp with plaster

Description:

According to World Health Organization statistics, the human common cold is the most prevalent known disease of humans. The majority of colds are caused by the human rhinovirus--an enterovirus genetically similar to dangerous viruses like polio and hepatitis A. Rhinovirus infection can lead to 72-hour periods of morbidity, including symptoms like sore throat, runny nose, and muscle weakness, often causing people to miss school or work. Rhinovirus is inert until infection occurs causing

the immune system to then combat the virus. Rhinovirus transmission is usually *via* aerosolized respiratory droplets or contact with contaminated surfaces. Once in the body, the virus binds to the cell surface, allowing it to enter cells. Cells use the Intercellular Adhesion Molecule 1 (ICAM-1) signaling protein to latch on to each other, but viruses bind to ICAM-1 using a site on the virus surface known as the "canyon." Since there are over 150 rhinovirus serotypes, it is impossible to put every serotype in one vaccine. Instead, scientists are developing new drugs, such as pleconaril, that bind to the canyon and prevent the virus from attaching to the host cell. This then prevents the virus from replicating thus eliminating the spread of the virus and the symptoms caused by it. The Marquette University High School SMART Team modeled a portion of the human rhinovirus capsid bound to pleconaril using 3D printing technology.



Specific Model Information:

- The alpha carbon backbone is colored dodger blue.
- Beta sheets are highlighted in medium spring green.
- Pleconaril is displayed in ball and stick and colored yellow.
- Hydrogen bonds are colored white.
- Structural supports are colored white.

<http://cbm.msoe.edu/smartTeams/>

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