CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Raven S. Burrell

Project Number
S1803

Project Title
In Search of New HIV-1 Integrase Lead Molecules

Abstract

Objectives/Goals
I hypothesize that the prescreened small molecules will have distinct functional groups that will show inhibitory activity.

Methods/Materials
Conducting Enzymatic Assays
Step 1:Make IN cocktail which contains Mn2+ cofactors.
Step 2: Make DNA cocktail, which contains pH buffers.
Step 3: Put IN cocktail into all labeled tubes (except DNA control).
Step 4: Add DMSO and compound dilution into specific tubes according to experimental template.
Step 5: Incubate at 30°C for 30min.
Step 6: Add DNA cocktail to all tubes and incubate for 1hr.
Step 7: Quench experiment using denaturing dye.

Gel Electrophoresis (PAGE)
Step 1: Make polyacrylamide gels.
Step 2: Pour TBE buffer into apparatus compartments and pre-run.
Step 3: Load an aliquot of each reaction tube into the wells of the gel.
Step 4: Set up positive and negative electrodes on the apparatus.
Step 5: After sufficient time (~3hrs),place the gel into a gel dryer for an hour.
Step 6: Place gel in a cassette with a P32 storage screen, expose overnight, and scan.

Results
The data that I collected demonstrated that: VL 104 IC50 value for cleavage and strand transfer was less than 33µM, VL 109 IC50 value for cleavage was 58µM and 26µM for strand transfer, VL 142 IC50 value for cleavage was 44µM and 17µM for strand transfer, VL 94 showed 50% inhibition, and RUS II Box 11 E10 showed 50% inhibition. Since, majority of my experiments had no inhibitory activity, I will conduct more experiments to discover various lead molecules. Also, some of the strands are smudged, which causes the small molecule to appear as inactive, but may be active.

Conclusions/Discussion
I conclude that I will have to continue to conduct more experiments since majority of my data and results showed no inhibitory activity. Once I receive accurate data, then I will conduct dose responses to test small molecules at different concentrations to further research if integrase was inhibited.

Summary Statement
To search for lead molecules that will result in inhibition of HIV-1 integrase.

Help Received
Used lab equipment at University of Southern California School of Pharmacology under the supervision of Dr. Neamati and mentor Tino Sanchez; Mother helped paste items on board.