# CALIFORNIA STATE SCIENCE FAIR
## 2012 PROJECT SUMMARY

**Name(s)**

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**Project Number**

**S1710**

**Project Title**

# HIV-1 Integrase and LEDGF/p75 Protein Binding

**Abstract**

**Objectives/Goals**

Using a selective alpha screen assay process, we can identify if certain small molecules can inhibit or disrupt the interaction between the viral enzyme, HIV-1 integrase, and the human protein, LEDGF/p75 (lens epithelium derived growth factor).

**Methods/Materials**

There are thousands of structurally diverse compounds in our lab and we perform random screening of these compounds. Through an alpha-screen assay process, we test for protein-protein interaction. One microliter of each compound is added to tube of 99 microliters of alpha screen wash buffer for dilutions. Once the compounds are diluted, a template is made on an excel sheet, assigning where each drug will be placed on the assay plate. The template is used as a guide when pipetting 5 microliters of each compound into their corresponding wells. Also included are 2 sets of 3 normal controls (of only beads, buffer, and the two proteins), a beads control, and a buffer control. After the compounds are placed into the wells, 5 microliters of each protein are added to each well and the plate is incubated for an hour at 4 degrees Celsius. After this incubation period, the donor and acceptor beads are added to each well. The plate is placed again into an incubator, set at 37 degrees Celsius. In our assays, each light-sensitive alpha-screen bead, donor and acceptor, binds to its respective protein: HIV-1 integrase and LEDGF. After another hour-long incubation period, the assay plate is taken to the Envision machine where the tray is read and the results of the interactions are quantified.

**Results**

Out of a total of 1500 drugs tested so far, more than 1400 were found to be inactive, and 17 were found active.

**Conclusions/Discussion**

In the future, our goals include continuing random screening of drugs, conducting dose responses for drugs that are active from initial assays, and testing actives for toxicity through MTT assays. If active drugs are non-toxic to humans through MTT assays, we begin the rest of the trials, including animal testing and clinical trials. A new important concept being currently researched is finding new cofactors or binding partners for integrase.

**Summary Statement**

We are attempting to find small molecule compounds that can disrupt the interaction between the proteins, HIV-1 integrase and LEDGF/p75, through random screening of drugs and a selective alpha screen assay process.

**Help Received**

Used lab equipment at USC School of Pharmacy under the supervision of P.I. Dr. Nouri Neamati, mentor Erik Serrao, Junjie Qian, Dr. Tino Sanchez; Participants in Bravo-USC Science Technology and Research Program (STAR).