**DEPARTMENT OF CHEMISTRY**
**College of Arts and Sciences**

**SUMMER RESEARCH OPPORTUNITIES**
**FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: MARCH 1, 2004**

*The Department of Chemistry is pleased to offer the following research project(s) for the summer of 2004. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be, and if possible, develop a timetable for the twelve-week research period.*

## GART Enzyme

**Professor Pearl Tsang**
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For all the ensuing projects, the common theme of our laboratory research involves elucidating the structure versus function relationship of proteins/nucleic acids, in order to better understand how these very important biological molecules function in vivo.

This research involves studies of the substrate and ligand-binding properties of an enzyme involved in de novo purine biosynthesis. This enzyme is being studied in order to better understand its mechanism and function. GART represents an important target for chemotherapy since cancer cells engage employ *de novo* purine biosynthesis more than normal cells do. This research involves the use of techniques such as protein assays, protein expression, protein purification and spectroscopic techniques, including Circular Dichroism (CD), fluorescence and NMR. This work is done in collaboration with Prof. Caperelli, College of Pharmacy,U. of Cincinnati.

## tRNA Synthetase N-Terminal Domain

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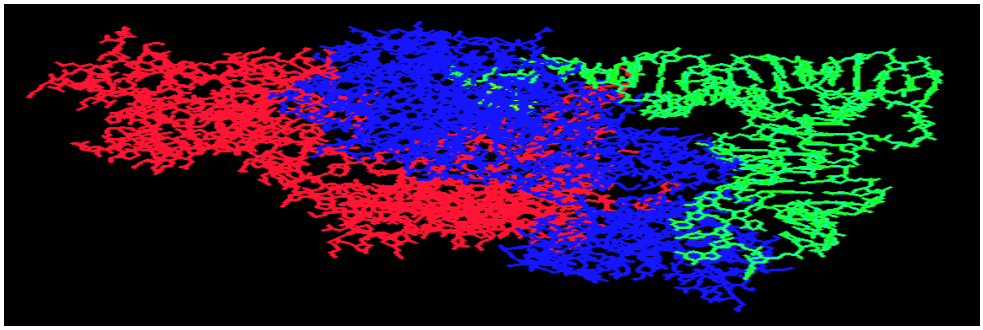
This research involves the study of peptides derived from the N-terminal domain of human lysyl tRNA synthetase. This synthetase extension does not exist in prokaryotic systems and its precise function is still unknown but is critical for proper enzyme functions during protein translation. The exact role of this N-terminal domain will be investigated by studying the binding properties of this domain with tRNA and DNA. This work will also involve spectroscopic studies (fluorescence, NMR and CD) to characterize where and how this domain interacts with important DNA and tRNA molecules.



***The above is a graphics image of a tRNA synthetase multimer complexed with its cognate tRNA molecule (green).***

## Envelope Proteins of HIV-1

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The role and function of different glycosylated proteins during the process of infection by HIV-1 virus represents an ongoing area of active research. A portion of one such HIV-1 protein is studied in our lab in order to investigate how its structural properties are pertinent to its function during infection. The research will entail use of spectroscopic and chromatographic methods aimed at characterizing the interaction of these viral proteins with antibodies and other proteins related to virus infection.

***This cartoon of HIV-1 infection shows the viral glycoproteins interacting with specific proteins on the host cell membrane.***