Faculty and their undergraduate students who received fellowships between January and July 2000 are:

**Kim L. R. Brouwer, Pharm.D.**, Ph.D., Professor, Division of Drug Delivery and Disposition, University of North Carolina at Chapel Hill

**Student: Mitesh G. Prajapati**

“Mechanism(s) of induction of brain P-glycoprotein.” The purpose of the proposed study is to evaluate the time course, dose-dependency, gender specificity and cellular mechanism(s) of P-gp induction by morphine. Male rats will receive different doses of morphine or saline for 5 days. Rats will be sacrificed by decapitation at specified times, and P-gp in brain tissue will be detected by Western blot analysis. To determine if morphine-induced increases in P-gp expression are due to increased mRNA, tissue samples will be subjected to Northern blotting. Results of these experiments will allow assessment of the dose- and/or time-dependency of P-gp induction. Gender differences in P-gp induction will be determined in separate studies. The morphine brain-to-serum concentration ratio will be quantitated and examined as a function of P-gp expression to evaluate the potential pharmacodynamic impact of P-gp induction.

**Nandita G. Das, Ph.D.,** Assistant Professor of Pharmaceutics and **Sudip K. Das, Ph.D.,** Associate Professor of Pharmaceutics, Department of Pharmaceutical Sciences, Idaho State University

**Student: Jerry T. Holland**

“Nanoemulsion Delivery System for Poorly Soluble Antineoplastic Agents.” Major drawbacks of many currently marketed antineoplastic drugs include poor aqueous solubility and toxicity to host tissue such as the bone marrow and gastrointestinal tract. This study proposes the formulation of lipid-based nanoemulsion delivery systems (average droplet diameter <500 nm) administered orally or parenterally, which would enhance the bioavailability of an antineoplastic drug and improve its efficacy by reducing dosage size and frequency and thus reduce toxicity. Tamoxifen citrate, a drug of choice in breast cancer therapy but with limited aqueous solubility, will be the model drug for this project.

**Teruna J. Siahaan, Ph.D.,** Associate Professor, Department of Pharmaceutical Chemistry, University of Kansas

**Student: Jennifer Page**

“Modulation of intercellular junctions of HAV peptides.” The long-term objective of this project is to understand how to modulate tight intercellular junctions by regulating protein interactions that mediate the intercellular junctions for improving drug delivery. Tight intercellular junctions are mediated, at least in part, by cell surface proteins called E-cadherins. Cadherin-mediated cell-cell adhesion is produced by homophilic interactions in which E-cadherin molecules from one cell interact with other E-cadherin molecules from another cell. The hypothesis is that peptide sequences similar to those found in the binding region of cadherin-cadherin interactions can be used to modulate E-cadherin-mediated cell adhesion in an equilibrium fashion; thus, they can be used to identify the mechanisms of intercellular junction formation by E-cadherins. Here, the undergraduate student will use cadherin peptides to modulate intercellular junction for improving paracellular delivery of marker molecules using in vitro cell culture models.

**Philip C. Smith, Ph.D.,** Associate Professor, Division of Drug Delivery and Disposition, University of North Carolina at Chapel Hill