



**Public Lecture by Dr. Paul Insel**

**DRUGS and DRUG RESPONSES IN THE ELDERLY**

**Wednesday, January 15, 2003 at 6:00 p.m. in the Garren Auditorium, Basic Science Building**

**Sponsored by the Sam & Rose Stein Institute for Research on Aging, UCSD**

The elderly have several age-related changes that influence drug handling and drug action. Some of these changes involve alterations in structure and function of key tissues involved in the distribution and metabolism of drugs. Other changes result from the onset of diseases associated with aging, such as degenerative arthritis (osteoarthritis), hypertension, peripheral vascular and cardiac disorders, and neurodegenerative disorders (Alzheimers, Parkinson's, etc.). Given the frequency with which such diseases occur, it is perhaps not surprising that approximately half of all drugs prescribed are for elderly patients. Some estimates indicate that the average elderly patient takes 3 or more drugs as a consequence of treatment for chronic (and acute) diseases. This use of multiple drugs ("polypharmacy") creates potential problems in terms of adverse effects, in particular because of interactions among the multiple drugs. Changes in body size and composition and organ function that occur as a part of normal aging are particularly important factors in the altered handling and action of drugs in the elderly. These changes, which include an overall decrease in size, a decrease in lean body mass relative to body fat, and decreased blood flow to vital organs, contribute to quantitative differences in drug handling between young and older individuals. Of particular importance is an age-related decrease in blood flow to the kidney, which is the location where most drugs (or their metabolites) are excreted into the urine. As a result, a consequence of aging tends to be a decrease in dose of drug that is required to treat a number of conditions. There can also be increased sensitivity to drugs, especially in terms of susceptibility to decreases in blood pressure, decreases in hearing, and damage to the kidney. In addition, one can observe so-called "paradoxical" effects, for example, drugs given to promote sleep may induce agitation. Paradoxical effects represent qualitative changes in drug response that occur in the elderly. Further complicating this issue is the consumption of OTC meds and herbal remedies which may adversely interact with prescription drugs. Therefore, it is important that elderly patients work closely with their physician and other health care providers to make sure all are informed about prescribed and over-the-counter medications that are taken. This is important so that medication regimens can be personalized. By optimizing therapy in this way, one hopes to avoid drug-drug interactions and undesirable side effects as well as to achieve the most beneficial effects of prescribed medications in the elderly.