RESEARCH FUNDING

SPACE BIOPROCESSING GETS A BOOST

WASHINGTON, D.C.—In November 1984 the National Aeronautics and Space Administration awarded nearly $3 million in grants for the development of two bioprocessing research centers. NASA set 1992 as the target date for construction of its $8 billion manned space station. As the deadline approaches, the space agency finds itself under pressure to demonstrate that commercialization of space is, in fact, possible. The recipients—the University City Science Center (Philadelphia, PA) and the Center for Separations Science (University of Arizona, Tucson)—will each receive $450,000 annually for three years. Both centers are to develop and maintain "cutting edge" technology in bioprocessing.

The University City Science Center is a non-profit organization. Paul Todd, director, says that the Center has three major thrusts: to act as a focal point for purification research (fluids) and analytical research (particles), and to serve as a "gateway to space for biotechnology." The Center will house a core lab and serve as an information clearinghouse for the large number of industrial companies and universities associated with the new project. This "user consortium" will conduct ground-based experiments, either cooperatively or on a fee-paying basis. If results of these trials reveal commercial applications suitable for microgravity, researchers will design experiments for a 1986 shuttle flight.

Todd says experiments on the crystallization of proteins and other macromolecules should be aloft by the end of 1985 in one of two forms: the get-away special and the mid-deck experiment. The get-away special is self-contained. It either has a built-in timer or requires only the push of a button to start. The mid-deck experiment requires more hands-on participation by the crew and so takes longer to design.

Todd says that the Center will also run experiments using the McDonnell Douglas Corp. (St. Louis, MO) continuous-flow electrophoresis device, permanently installed on the shuttle. These experiments, scheduled for 1985, will study liquids and solutions in microgravity.

Miller Bier, head of the Center for Separations Science in Tucson, has also studied the effects of microgravity on liquids. His pilot experiment on a 1984 shuttle flight studied the extent of electro-osmosis in isoelectric focusing. Electro-osmosis is the movement, in an electric field, of a liquid with respect to immobilized colloidal particles. Bier says that "the space experiment of 1984 worked fine, but it taught us a lesson in modesty." It turns out that microgravity is a more complicated environment than even he had predicted. Secondary effects of electro-osmosis were unexpected and are still not clearly understood.

The research group at Arizona is rather small, but they are establishing a broad collaborative base. Bier says his personal vision is to create a center of excellence in a wide range of separation sciences, including the "orphan technologies" that research scientists abandoned in favor of the few preferred technologies of today.

—Jennifer Van Brunt