



Alexander Hollaender managed the Laboratory's Biology Division from 1946 to 1966.

biological understanding and improved tools for science and medicine.

With support from the National Cancer Institute, the Biology Division opened a Biophysical Separations Laboratory, taking advantage of centrifuge designs by Paul Vanstrum and fellow researchers at the Oak Ridge Gaseous Diffusion Plant. The team there had devised improved centrifuges to produce enriched uranium for nuclear reactor fuel, and in 1961 a biology team headed by Norman Anderson, with advice from Jonas Salk of polio vaccine fame, adapted centrifuge technology to separating viruses from human leukemic plasma, hoping to identify a cure for leukemia. This striking use of nuclear separations technology to advance science and medical research led in several directions.

A hollow cylinder subdivided into sectors, which creates a zonal centrifuge whirling at high speeds, can separate substances at the molecular level into their constituents according to size and density. Anderson and his team experimented with centrifuges whirling up to 141,000 revolutions per

minute and learned the machines could separate impurities from the viruses causing polio and Hong Kong flu. By cleansing vaccines of foreign proteins, the zonal centrifuge could produce a vaccine pure enough to minimize the fever reactions that often accompanied immunizations. By the late 1960s, commercial zonal centrifuges based on the ORNL invention produced vaccine for millions of people and purified rabies vaccines for their pets.

Peter Mazur and Stanley Leibo, both of the Biology Division, pioneered the freezing and transplanting of embryos, successfully implanting the thawed embryos of black mice in white female mice in 1972. With other cryobiologists, they developed methods to preserve embryos from superior cattle and implant them into the uteruses of inferior animals, helping to spur a revolution in animal husbandry that increased the quality and abundance of meat.

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Peter Mazur pioneered ways to freeze and store mouse embryos for implantation into other mice.