Hybridomas: aiming Ehrlich's 'magic bullet'

On Sept. 1, WU and Mallinckrodt, Inc., announced a joint research project totaling over $1.8 million to study the production of monoclonal antibodies from the artificially created cells called hybridomas, and to pursue the possible marketable applications of this technology in the fields of medical diagnosis and treatment. How hybridomas work and the breadth of their possible impact on a wide variety of diseases are the subjects of the following story.

The hybridoma cell — an artificial fusion between a "parent" cell that produces antibodies (tiny proteins that act as a line of defense which can be targeted with foreign substances entering the body) and a tumor cell — is one of the simplest and most startling innovations in the genetic field. Like a microscopic version of the centaur (that mythical creature who was part man and part horse), a hybridoma cell features the best of two things — the normal parent cell's ability to manufacture antibodies and the malignant tumor cell's capacity for reproducing virtually forever.

The result is an "immortal" line of antibody-producing cells.

By means of a basic technique pioneered by Cesar Milstein and Georges Kohler of Britain's Medical Research Council in 1975, scientists can now clone "purebred" lines of hybridoma cells that produce extremely specialized antibodies called monoclonals.

Monoclonal antibodies act in the body like germ-sized commandos to perform exquisitely precise functions.

An organism produces antibodies only when foreign matter, such as a virus or a bacteria, stimulates the body to do so. Immunologists call alien molecules that trigger this immune reaction antigens. Certain types of antibodies match precisely with certain kinds of antigens. When an antibody locates its corresponding antigen, it attacks by binding to the foreign cell's surface in an arrangement that visually resembles a ball-and-socket joint.

What researchers can do with hybridomas that could not be done before is grow pure lines of cells that produce individual antibodies with specific abilities. One of the intriguing possibilities of hybridoma research is the realization of pioneer immunologist Paul Ehrlich's (1854-1915) prophecy of a "magic bullet" to diagnose and treat cancer.

"When one has anti-tumor ability which can be targeted with radioactive molecules," explained Joseph M. Davie, head of the WU department of microbiology and immunology, "they will go to the tumor cells and bind to their targets with greater accuracy and less toxicity than any other known way of doing that in the past."
Some men are made of iron, some of silver and some of gold. This notion existed as far back as Plato, who called it a great lie. But it was not until the early 1900s that the science of genetics was used to rationalize the active elimination of "defective" family lines as a cure for social problems. "The biology of genetics — or breeding better humans — was not really valid, even in its own day," contends Garland E. Allen, WU professor of biology and historian of science. "The traits that were said to be genetically controlled — bad temper, laziness, alcoholism, sex-farings, feeblemindedness — are so vague and so subject to environmental causes that no one could ever provide evidence that they were hereditary."

According to Allen, the eugenics movement was a reform movement — one of a number of responses to vast economic and social changes taking place in the United States before and after World War I. He is studying these changes this fall while on sabbatical at Harvard's Charles Warren Center for Studies in American History.

"I'm interested in the larger question of how and why such a movement got started," said Allen, who noted that eugenicists were largely responsible for the passage of compulsory sterilization laws in 53 states, as well as the 1924 Johnson Act, an immigration restriction law that favored northern Europeans. "The whole movement was very racist, very anti-ethnic," Allen said.

"You can't always predict the results of research, especially in the social sciences," said Allen. "But I think we're going to see a resurgence of this type of research."

"We need to understand how it interacts with people's lives more and more," he added. Allen believes that the scientists of the eugenics movement were trying to understand how science could be used to improve the human condition.

"The NIH, which is the major source of federal funding for basic research, is going to have to start thinking about how important this type of research could be for the future of society," he said.

"We need to have a public debate about whether or not this type of research should be funded," Allen said. "If we don't, we may end up with a society that is less healthy than it could be."
Nault to direct field study programs

Richard L. Nault, WU assistant professor of education, has been appointed coordinator of educational alternatives for 1981-82, a new part-time educational administrative position within the College of Arts and Sciences, Dean Linda B. Salamon has announced.

Nault will administer and assess the field study program and supervised performance programs, both of which provide opportunities to learn outside the classroom. A specialist in educational administration, Nault will continue to work part-time at the University's Graduate Institute of Education, where he teaches in the secondary education programs. He also serves on the board of College Advisors.

Currently, some 30 to 75 students are enrolled in the supervised performance program, according to Nault. They spend about five hours a week for two semesters working on special projects both on and off campus under the direction of supervisors. If their performance is judged satisfactory, they earn three credits for this work.

The field study program provides an opportunity for more intensive alternatives to classroom learning. With the appropriate approval and supervision, students may spend an entire semester in such field work, which provides 12 units of academic credit.

Previously, such students had worked on political campaigns and focused on research. Nault hopes to expand the scope of this program and to encourage greater student participation.

Nault, who joined the WU faculty in 1974, received the faculty teaching award from the Council of Students of Arts and Sciences in 1979 and last year received a faculty teaching award from the WU Alumni Association at Founders Day.

Soccer Bears face 19-game schedule

A 19-game schedule that includes four traditional rivals from the midwest and NAIA National Champion, Quincy College, faces the Battling Soccer Bears of WU this fall.

The Bears are now three and one, having beaten Indiana State University-Terre Haute 2-1; Greenville College 3-2; and Indiana State University-Evansville 1-0. The Bears lost their season opener 2-1 to University of Missouri-Rolla.

The traditional rivalries will resume against Maryville College on Sept. 23; Blackburn College on Sept. 27; MacMurray College on Oct. 4; and the University of Missouri-St. Louis on Oct. 21.

Quincy College will be the regular season's wrap-up opponent on the NAIA champions' field on Sunday, Nov. 1.

Faculty Notes

Rodey Batiza, assistant professor of earth and planetary sciences, has been invited to serve on the Origin and Evolution of Oceanic Crust Panel of the Conference on Scientific Ocean Drilling. The international panel includes representatives from the United States, Canada, France and the Soviet Union. They are investigating how to best use deep sea drilling ships like the Glomar Challenger for scientific studies of the ocean floor.

Will Dean Gillett and Seymour V. Pollack, assistant professor and professor of computer science, are coauthors of a new textbook, An Introduction to Engineered Software. The book, designed for an undergraduate course, will be published in late September by Holt, Rinehart and Winston.

Four members of the Department of Systems Science and Mathematics — professors John Zaborszky, Tryh-Jong Tarn and David Elliott, and associate professor Hinoaki Mukai — presented papers at the Tri-Annual Congress of the International Federation for Automatic Control. The congress, an organization representing 35 nations, was held August 24-28 in Kyoto, Japan. Zaborszky chairman of the department, is president of the U.S. chapter of the congress. He is continuing to Peking, China, where he has been invited to lecture at the Chinese Academy of Sciences. His talk is entitled, "The Past, Present and Future of Systems Science."
Lectures

Thursday, September 17

Friday, September 18

Monday, September 21

Tuesday, September 22
10 a.m. Woman's Club Welcoming Coffee. Open to all women faculty and staff members and wives of faculty and staff. University House, 6200 Forsyth Blvd.
11 a.m. Departments of Technology and Human Affairs and Civil Engineering Colloquium, "Environmental Impact of Storm Water Management Impoundments." Art Geis, urban wildlife specialist, U.S. Fish and Wildlife Service. 101 Lopata.

Wednesday, September 23
11 a.m. Assembly Series Lecture with Justin Kaplan, National Book Award winner, on the writings of Mark Twain and Walt Whitman. Graham Chapel.
8:30 p.m. Hilfiger Foundation Egyptian-Israeli Dialogue, commemorating the third anniversary of the Camp David peace talks. Gideon Saner, Wash Basham University, parts of Israel's leading daily newspapers, and Ahmed Alshaba, Washington correspondent for Al Arabi daily. Brown Hall Aud. $1.
4 p.m. Sixth Annual Mildred Trotter Lecture, "Recent Findings on the Biochemical and Functional Organization of the Glomerular Basement Membrane." M. G. Farquhar, professor of cell biology and pathology, Yale U. School of Medicine. Call V. Moore Aud., 4380 Scott Ave.
4 p.m. Department of Chemistry Seminar, "Models for Photonic Electron Transfer," John Connolly, Solar Energy Research Inst., Golden, Colo. 311 McKinnon Lab. (Coffee hour at 3:30 p.m. 561 Lauterborn.)

Performing Arts

Friday, September 18
8 p.m. Edison Theatre Presentation, the Bella Lewinsky Dance Company, a ten-member modern dance troupe from Los Angeles. Edison Theatre. Tickets are: $6 general admission; $4.50 for area residents, WU faculty and staff; $3 for WU students. Tickets available at Edison Theatre box office. (Also 8 p.m., Sat., Sept. 19, Edison Theatre.)

Calendar Deadline

The deadline to submit items for the calendar period of Oct. 8-17 is Sept. 24. Items must be typed and must state time, date, place, nature of event, sponsor and admission cost. Incomplete items will not be published. Include speaker name and identification and title of the event. Submitting items, please note name and telephone number. Address items to Susan Kringle, calendar editor, Box 1142.