attract the sperm. So, Lowe says, after he and Singh cloned the gene for the sperm enzyme, "We took the intellectual leap that the catalytic site would be conserved enough to use the sea urchin gene as a probe for the receptor gene." It was, and the researchers were able to capture the human, and then the rat, receptor gene.

The proteins encoded by the mammalian receptor genes contain slightly in excess of 1000 amino acids. The receptor sequence indicates that it is embedded in the cell membrane with the segment containing the first 440 amino acids projecting to the cell exterior, where it forms the binding site for the blood pressure–regulating peptide. The remainder of the protein projects into the cell interior. This inner segment contains a sequence that has all the earmarks of a guanylate cyclase, thus confirming that the enzyme is an integral part of the receptor.

That is what makes this receptor so unusual. Certain others, such as the adrenergic receptors studied by Caron and his colleagues, use cyclic AMP, a structural cousin of cyclic GMP, as their second messengers. But these receptors do not synthesize the cyclic AMP themselves. They work through intermediaries, the G proteins, that control the cyclic AMP–synthesizing enzyme.

Atrial natriuretic peptide actually has two receptors. The gene for the other one has also been cloned, by John Lewicki's group at California Biotechnology, Inc., in Mountain View. The external, peptide-binding segments of the two receptors are similar.

But the internal portion of the receptor cloned by the Lewicki group is very short and does not contain a guanylate cyclase segment. This receptor may not be involved in signal transmission, but may instead help to regulate blood concentrations of atrial natriuretic peptide by binding it and taking it out of commission.

The larger receptor has, in addition to the peptide-binding and guanylate cyclase domains already mentioned, a third domain. "The protein is an intersection in evolution," Lowe says. "It has three different and distinct domains found in three different families of proteins."

The third domain has the features of a tyrosine kinase, an enzyme activity found in growth factor receptors. In the natriuretic peptide receptor it may just bind the compound that guanylate cyclase converts to cyclic GMP.

Whether other cyclic GMP–linked receptors will prove to contain integrated guanylate cyclase activity remains to be seen. But at very least, the cloning of the genes for the natriuretic peptide receptor should help to clarify how the blood pressure regulator produces its effects. ■ JEAN L. MARX

Superconductivity Stars Move

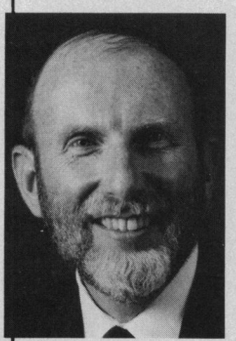
Two top players in the high-temperature superconductivity game have announced they are leaving their teams to join new franchises. Arthur Sleight, a research leader at Du Pont, will move to Oregon State University in Corvallis this September, and Allen Hermann, chairman of the physics department at the University of Arkansas, will defect to the University of Colorado at Boulder in January. Neither hiring university has an active superconductivity research effort now, so that each of them is like an expansion club trying to build a team around a single superstar.

Both scientists cited the opportunity to do their own research more effectively as part of the reason for the move.

Sleight, 50, will hold the Milton Harris Chair in the Oregon State chemistry department. It is the university's first endowed chair, named after the Oregon State alumnus who donated $1 million for its creation. The position will pay $84,000 over a 9-month academic year. Sleight spent the past year on sabbatical from Du Pont at the University of California at Santa Barbara, and had been recruited by several universities, including the University of California at Berkeley. It was the second time Berkeley missed a shot at a top name in high-temperature superconductivity—last year, it failed in a highly publicized effort to woo Paul Chu from the University of Houston.

Arthur Sleight

Hermann, also 50, will become the most highly paid professor in the University of Colorado physics department, with an academic-year salary of $81,500. In 1988, along with Zhengzhi Sheng of the University of Arkansas chemistry department, Hermann announced the discovery of a thallium-based superconductor that lost resistance to an electric current at more than 120 K, still the highest critical temperature of any known superconductor. That discovery catapulted the Arkansas team from an obscure superconductivity research group to one of the best known and best respected in the country.



Allen Hermann

The two relocations have several parallels. Both scientists are moving from established superconductivity programs to schools where they will practically have to start from scratch. Both Colorado and Oregon State, however, do have scientists in related fields, especially materials science.

Further, both schools can point to nearby institutions that should interact well with their new hires. Teledyne Wah Chang, an Albany, Oregon–based division of Teledyne Corporation, is a major producer of low-temperature superconducting materials and contributed $60,000 in start-up funds for Sleight's lab. Near the University of Colorado are the National Institute of Standards and Technology and the Colorado School of Mines, each with programs in or related to high-temperature superconductivity.

Why would a researcher move from a successful program to an expansion team? "A number of us who have been right smack in the middle [of the race to develop high-temperature superconductors] are looking to get off to the side," Sleight said. It is quite demanding to be a scientist in a large program, he said, and many superconductivity researchers are looking back fondly on the days when they could actually take time off on the weekends. During his 25 years at Du Pont, Sleight rose to research manager, directing about 100 people, and later stepped down to a research leader in charge of a team of about 12. Taking early retirement from Du Pont will allow him to pursue his own interests more closely, including looking for totally new superconducting materials, he said.

Hermann told local newspapers that several factors influenced his choice. He gets a 33% salary increase and, since he will not serve as department chairman, he will have more time for research. The University of Colorado offers better facilities for his work, and the Boulder area has a better support structure for superconductivity research than Fayetteville, Arkansas. He also cited personal reasons—he has family in Colorado, and both he and his wife like the area. ■ ROBERT POOL