

Birth control by jamming LHRH

New approaches to contraception are sizzling on the back burners of numerous labs. One is to find a way of thwarting the actions of the luteinizing hormone-releasing factor. Secreted by the hypothalamus of the brain, LHRH serves as a master switch over the release of sex hormones in the body, thus controlling ovulation in the female and sperm formation in the male.

Andrew Schally of the Veterans Administration Hospital in New Orleans and Roger Guillemin of the Salk Institute in La Jolla have been looking for a synthetic chemical that is similar to, but slightly different from, LHRH, and that can be used to block LHRH's usual effects (SN: 2/10/73, p. 93). Now another effort to "jam" LHRH's effects—with antibodies—is being tried by J. L. Hodges and J. P. Hearn of the MRC Unit of Reproductive Biology in Edinburgh.

Hodges and Hearn report in the Feb. 24 NATURE that they are the first researchers so far to use antibodies to neutralize the action of LHRH in primates. More specifically, they have immunized 10 marmoset monkeys—5 males and 5 females—against LHRH, and 6 of the 10 developed levels of antibodies high enough to suppress ovulation and sperm formation.

However, immunization totally blocked testosterone secretion in the males. Since testosterone is necessary for maintenance of sex characteristics and sex drive, the researchers doubt whether such immunization would be a practical birth control method for men. But they do believe that it might be practical for women since it would still allow necessary estrogen secretion.

Tracking a human cancer virus

Although there was ample hoopla about the claimed discovery of a human cancer virus six years ago, proof for such a virus has still not been obtained. Nonetheless, some doughty virologists continue to seek it.

Sol Spiegelman and his colleagues at Columbia College of Physicians and Surgeons now report, in the February PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, that they have purified a reverse transcriptase enzyme from human breast cancer particles that strikingly resembles that of animal RNA tumor viruses. To date, such an enzyme has not been detected in healthy human breast tissue or in benign human breast tumors.

Human breast cancer particles resemble animal RNA tumor viruses in other ways, too, past studies have shown. For instance, a particle consists of a membrane surrounding a reverse transcriptase enzyme and an RNA molecule similar to the RNA's of mouse and monkey mammary tumor viruses.

Egg cell maturation

During the process of development, the eggs of mammals and many other animals stop dividing for a while in order to grow. They then continue dividing and finally reach maturation, courtesy of hormonal stimulation, release from ovarian follicles or fertilization.

It is well known that protein synthesis is required for the successful completion of egg maturation. In the amphibian egg, such maturation appears to be totally under the control of protein manufacture equipment in the egg-cell cytoplasm. In mammals, however, protein synthesis that assists egg maturation depends on a mixing of the egg cell's nuclear contents with its cytoplasm, Richard M. Schultz and Paul M. Wasserman of Harvard Medical School report in the February PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. Failure of the mouse egg's nuclear membrane to break down prevents all the changes in protein synthesis that normally accompany egg maturation.

Peer review system: A vindication

A detailed investigation of the peer review system for evaluating research grant proposals, under fire from certain quarters in recent years, has vindicated the equitability of the system. Peer review, the evaluation of grant applications by other scientists in the same field, is the principal means the government science agencies use to assure that funds for research are distributed to support the most promising research and most capable scientists.

In response to various rumblings of criticisms, the Committee on Science and Public Policy of the National Academy of Sciences arranged to have the brothers Stephen and Jonathan Cole, professors of the sociology of science at the State University of New York and at Columbia University, respectively, conduct a detailed study. The Coles and research associate Leonard Rubin reviewed 1,200 decisions on applications for grant support in 10 areas of science at the National Science Foundation. Of these 1,200 decisions (about half positive, half negative), 250 proposals were examined in the greatest possible detail. All comments of peer reviewers and all correspondence regarding the applications were perused. Seventy in-depth interviews were conducted with scientists involved in all levels of the peer review system. Data were examined statistically.

Philip Handler, president of the Academy, summarized preliminary results of the study (a final report will appear later) for the House Subcommittee on Science, Research and Technology in testimony Feb. 22: "I am pleased to say that the answer we have for you is unequivocal. The system is eminently fair and equitable and shows no sign of systematic bias."

The study, Handler says, found no evidence to support allegations of "an Old Boys' club" (an in-group of established investigators favoring applications from the same group to the detriment of applications from less-known, younger scientists). Statistically, Handler reports, the rankings given were independent of the home bases of the reviewers. "There simply was no evidence to support the hypothesis that peer review systematically operates as a network of 'old boys.'"

Nor was there much support for the "rich get richer" hypothesis (that eminent, higher ranked, more mature, more prolific investigators and past recipients of grants are favored). The academic ranking of the department in which the applicant received graduate training or is currently employed, the nature of his institution, the years since obtaining a Ph.D. and the academic rank of the applicant "all have only trifling influence on the outcome of the review," reports Handler. All other things equal, assistant professors fare quite as well as full professors. Young investigators fare almost as well as old ones. Persons from lower-ranked departments fare almost as well as investigators in higher-ranked departments.

Only two characteristics of the applicant show significant positive correlations with success in funds competition: the number of times his work is cited in the Science Citation Index and the number of years he's been funded by NSF. But even the effect of these was very small.

"Please understand that this is very surprising," he says. "We 'old boys' did believe that previous research productivity and place in the social structure of science" must have an effect.

"There simply is not a significant correlation between the peer ratings received by applicants' proposals and statistical indicators of their eminence or their past scientific performance," Handler concludes from the study data.

"The peer review system that has been operated by the National Science Foundation does so in an extraordinary equitable, fair manner without any evidence of systematic distortion. . . . In the gross, it appears to operate even better than we had supposed."