Semen protects against preeclampsia

A dangerous form of high blood pressure that strikes during pregnancy appears to be linked to the duration of the mother's sexual relationship with the father, a new study shows. The researchers believe that prolonged exposure to the father's semen helps trigger a protective response in the mother that later wards off this illness.

Doctors understand very little about what causes pregnancy-induced hypertension, including preeclampsia. Researchers know that the disorder most often affects women pregnant for the first time. But the new findings suggest that women who have just begun a sexual relationship with the father face the highest risk of this condition.

From February to July 1993, Pierre-Yves Robillard of the University Hospital of Pointe à Pitre, Guadeloupe, French West Indies, and his colleagues collected information from 957 women who had just delivered a baby in the hospital. The researchers gathered data about paternity by interviewing the mothers without their partners present.

The investigators noted that 102 of the women had developed pregnancy-induced hypertension. The majority had the mildest form of the disorder. However, 19 had progressed to preeclampsia, characterized by high blood pressure and protein in the urine. And two women had full-blown eclampsia, which can cause death.

The threat of preeclampsia increases significantly when pregnancy occurs within the first year of a sexual relationship, the researchers discovered. If a woman becomes pregnant within the first 4 months of such a partnership, her risk of developing preeclampsia is 12 times higher than if she had been with her partner for at least a year.

Although the incidence of preeclampsia declines in subsequent pregnancies, women who change their sexual partner reinstitute the risk of this disorder. In fact, such women are five times as likely to develop the condition as pregnant women who have remained with the father of their previous children, the team discovered. Robillard and his colleagues report their findings in the Oct. 8 LANCET.

Something in male ejaculate may help protect a woman from preeclampsia — if she's been repeatedly exposed to it, says David A. Clark of McMaster University in Hamilton, Ontario. Researchers don't know whether the sperm itself, the accompanying white cells, or the nourishing liquid called seminal plasma is responsible for the shielding effect.

Such a concept is not as far-fetched as it may sound. For example, scientists already know that substances from the father lead to a beneficial immune response in the mother that helps sustain a healthy placenta. In preeclampsia, blood flow through the placenta is inadequate. *— K.A. Fackelmann*

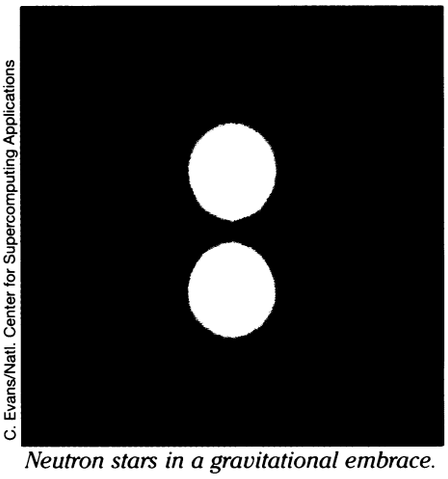
Natural mass limit for neutron-star pairs?

Many stars that begin life as heavyweights die a spectacular death. Gravity squeezes the core of such stars so forcefully that protons and electrons fuse; the center becomes a ball of neutrons. A rebounding shock wave then moves out from the compact core, ejecting the star's outer layers in a colossal explosion called a supernova. Only the naked core remains, a blob of nuclear material with more mass than the sun packed into a sphere only 20 kilometers in diameter.

Welcome to the realm of neutron stars, in which a speck of material just big enough to cover the period at the end of this sentence weighs about 100,000 tons.

In theory, the mass of neutron stars ranges from one-tenth to about twice the mass of the sun. But astronomers have known for more than a decade that at least some of these stars — those that exist in pairs — have a much more restricted mass range. Now, a new analysis of neutron-star pairs supports the assertion that formation mechanisms, rather than such general considerations as the stability of superdense matter, limit the mass of such neutron stars.

In addition, says Lee Samuel Finn of Northwestern University in Evanston, Ill., knowing the masses of binary neutron stars will prove invaluable for analyzing observations with a set of gravitational



C. Evans/Natl. Center for Supercomputing Applications

Neutron stars in a gravitational embrace.

Nobel for translator of cell messages

An array of chemicals orchestrates activities between and within cells. This week, a pair of molecular pharmacologists won a Nobel prize for their work identifying the family of agents responsible for relaying into cells the commands of hormones, drugs, and other external chemical messengers.

A 1971 Nobel prize honored the man who demonstrated that hormones work by carrying explicit commands to the outside of target cells. But before a cell can execute such a directive, something in the cell's barrier membrane must first convert that external command into the language of the "second messengers." These communicators are charged with relaying signals within the cell.

Martin Rodbell, retired from the National Institute of Environmental Health Sciences in Research Triangle Park, N.C., and Alfred G. Gilman at the University of Texas Southwestern Medical Center at Dallas share this year's Nobel Prize in Physiology or Medicine for identifying G proteins, which translate and integrate external signals for the cell's second messengers.

Fourteen years ago, Rodbell discovered that cellular communications relied on the presence of a molecule known as GTP (guanosine triphosphate). Seven years later, Gilman, then at the University of Virginia School of Medicine in Charlottesville, showed that GTP was located on the inner surface of cell membranes — bound to things that he termed G proteins.

Rodbell went on to study G proteins and how they interpret the cacophony of ambient signals for healthy functioning. (Faulty G proteins have recently been linked to disease, including cancer.) In his most recent work, Gilman has been teasing out the shape and function of G proteins and their targets.

National Institutes of Health Deputy Director Ruth L. Kirschstein says both men "made significant findings [on] how cells perceive and react in a coordinated way to the thousands of messages that bombard them. This Nobel prize underscores how important such basic studies are to understanding normal cell function and the diseases that result when cell processes go awry."

— J. Raloff