# Prion proponent wins Nobel for medicine

The 1997 Nobel Prize for Physiology or Medicine goes to Stanley B. Prusiner, a neurologist and biochemist at the University of California, San Francisco who pioneered controversial work on prions—malformed proteins widely believed to cause mad cow disease and other deadly neurological illnesses in humans and animals.

Prusiner coined the term prion, for proteinaceous infectious particle, in 1982 to label this protein—the first proposed infectious agent containing neither DNA nor RNA.

Some scientists still consider Prusiner's prion theory unproved because purified prions have not been shown to cause disease. Moreover, no one has shown how prions inveigle their harmless, normal counterparts in the body to become prions themselves, nor has anyone described the function of those normal proteins. Some researchers still suspect that a slow-acting virus plays a hidden role in the infection process.

Others regard Prusiner's prion research as visionary, not least because it faced doubt and scorn at the start. The Nobel prize "is a wonderful recognition of a huge amount of work," says Fred E. Cohen, a structural biologist at San Francisco who works with Prusiner.

The Nobel committee in Stockholm said Prusiner has amassed enough evidence to show that prions cause brain diseases. Prions joined a lineup of tiny thugs that includes bacteria, viruses, fungi, and parasites.

When Prusiner began studying brain diseases 25 years ago, he knew that certain ailments could be transmitted by moving brain tissue from an infected person or animal to a healthy one, but he didn't know what the agent of infection was. In 1982, he and his colleagues resurrected an untested concept that the agent might be a protein.

Prusiner reaped a whirlwind of derision and praise that has yet to die down. After a highly critical article in a 1986 issue of DISCOVER, Prusiner stopped talking to the press for a decade.

His work continued, however. A prion, he showed, can induce proteins in the body to fold into its own warped form, becoming prions themselves. In 1984, he and his colleagues cloned the gene that encodes the protein's normal version, called PrP. Prions apparently evade the immune system because the body can't distinguish them from PrPs.

They are different, however. PrPs are soluble in some detergents, but prions are not. Also, PrPs can be digested by the enzyme protease, whereas prions are partially resistant. Such distinctions enable prions to start a chain reaction that causes spongiform encephalopathies, or tiny holes in the brain, Prusiner holds.

One such affliction in humans, Creutzfeldt-Jakob disease (CJD), causes dementia, tremors, and death. Other prion ailments include kuru, a human disease in Papua New Guinea spread by ritualistic cannibalism; two very rare hereditary brain diseases in humans; scrapie in sheep; and mad cow disease. In recent years, British researchers have found that a variant form of CJD, as deadly as the classical disease, has emerged in humans (SN: 10/4/97, p. 212).

Prusiner's prion theory stands as the most widely accepted explanation of these diseases.

Laura Manuelidis, a neuropathologist at Yale University School of Medicine, appreciates Prusiner's work, although she doubts that prions are the sole cause of the ailments.

"I would have been happier if they had given Prusiner the Nobel prize for discovering a molecule that's very important in these diseases," she says. "[So far] there isn't a single infectious agent that doesn't have nucleic acid." It can take years to find viruses, as the 10-year hunt for the hepatitis C virus proved.

"[Prusiner's] is a revolutionary kind of work that advances ideas that are considered by some to be controversial," says Allen Roses, a neurologist at Glaxo Wellcome in Research Triangle Park, N.C. "It's a very, very convincing argument. It's up to the viral people to do the experiments to show [a virus] is there. He's done everything to show it's not." —*N. Seppa*


*A normal PrP protein (left) and the rogue version, the prion (right).*

# Mental disorders tied to teen parenthood

Teenagers who suffer from any of a variety of mental disorders tend to experience difficulties at home, at school, and with peers. A new study identifies another worrisome area for adolescents who endure depression, anxiety, substance abuse, or other psychiatric conditions—parenthood.

"Mental health professionals treating adolescents need to be sensitized to their higher risk of pregnancy [and parenthood], while family doctors and specialists treating teenage mothers or their children need to be sensitized to the mothers' higher risk of [having a] psychiatric disorder," concludes a research team headed by psychologist Ronald C. Kessler of Harvard Medical School in Boston.

Reasons for the link between teenage parenthood and mental disorders remain unclear, however, and may vary from one psychiatric diagnosis to another, Kessler notes. For instance, substance abusers may pursue an uninhibited lifestyle in a peer group that condones promiscuity, whereas depressed youngsters may accede to the sexual demands of their first boyfriend or girlfriend.

Over the past 2 decades, small-scale investigations have linked several factors to teenage parenthood, including substance abuse, poverty, growing up in a single-parent family, and persistent aggressive or criminal behavior.

Kessler's group expanded the scope of this research by analyzing interviews conducted with 5,877 people age 15 to 54 who took part in a nationally representative household survey. Interviews were conducted from 1990 to 1992.

Male and female respondents who reported having experienced childhood or adolescent mental disorders cited substantially higher rates of teenage parenthood, the scientists contend in the October AMERICAN JOURNAL OF PSYCHIATRY. Anxiety, mood, addictive, and conduct disorders all displayed a statistical association with subsequent childbearing by teenage girls and fatherhood for teenage boys.

Several survey limitations hamper interpretation of the results, Kessler notes. First, the data consist only of participants' self-reports, based on their memories of past symptoms and behaviors. Second, interviewers did not inquire about attention-deficit hyperactivity disorder and several other mental conditions that may also contribute to an association with teenage parenthood. Finally, the study cannot discount a common cause for the observed linkage, such as childhood exposure to physical abuse or other forms of adversity.

An ongoing study in New Zealand that has followed about a thousand people from birth to age 21 (SN: 4/15/95, p. 232) should provide a more rigorous look at the impact of mental disorders on young people's lives.

Nonetheless, the Harvard results add to a growing body of evidence that psychiatric disorders early in life are associated with a number of characteristics of welfare recipients, such as teen parenthood and dropping out of school, Kessler says. —*B. Bower*