A substantial minority of the entire sample had a history of anxiety disorders, such as panic attacks, in addition to chronic depression. Yet those with anxiety disorders responded as well to antidepressants as those without, holds Lorrin M. Koran, a psychiatrist at Stanford University Medical Center. In contrast, first-time major depression proves more difficult to treat with antidepressants when it is accompanied by anxiety problems, he says.

Participants with chronic major depression who expressed worries about physical health or cited physical symptoms, such as stomach problems and heart palpitations, were most likely to drop out of treatment, Koran notes.

Half the sample also received a diagnosis of personality disorder, adds Gabor Keitner of Brown University. Again, these individuals improved as much on antidepressants as those without personality disorders.

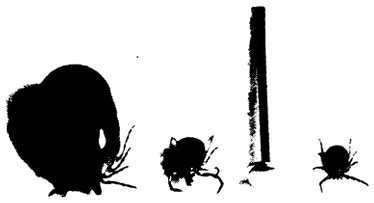
About 40 percent of volunteers had experienced the death of a parent or the divorce or separation of their parents during childhood, which may influence chronic depression, Keitner suggests.

Few participants had received adequate treatment with any antidepressant previously, says Michael Thase, a psychiatrist at the University of Pittsburgh. Past psychotherapy or drug treatment did not boost responses to antidepressants, he contends. — *B. Bower*

Lyme disease may not harm kids' brains

Borrelia burgdorferi, the bacterium that causes Lyme disease, penetrates some people's brain tissue, where it can remain dormant for many years before causing cognitive disorders. That's one reason patients and physicians fear the illness.

In the first prospective study to look specifically for cognitive effects of Lyme disease in children, however, researchers came up empty-handed. None of the 41 youngsters examined suffered neuropsychological problems as a result of the infection, Wayne V. Adams and his colleagues at the Alfred I. duPont Institute in Wilmington, Del., report in the August PEDIATRICS. In 1993, the Centers for Disease Control and Prevention received almost 2,000 reports of Lyme disease in U.S. children.



Agr. Res. Serv., USDA

Unless full of blood, a deer tick, carrier of the Lyme disease bacterium, can almost dance on the head of a pin. Left to right: engorged female, female, male.

In the study, the bacteria caused central nervous system disorders — such as Bell's palsy — in nine patients but no apparent cognitive ills.

However, the researchers administered neurological and cognitive tests only an average of 2 years after the patients became sick, and symptoms may take longer to develop, they acknowledge. As a result, the team continues to study the children. Also, these findings may not apply to anyone who did not receive treatment or received it too late.

In addition to the tests given to the participants, age 6 to 17, the researchers also compared the children's pre- and postdisease standardized achievement test scores.

Commenting on the study, pediatrician Ilona S. Szer of Children's Hospital and Health Center in San Diego cautions that "only in about 20 years can we be sure" that the bacteria left the children's brains unharmed. *B. burgdorferi* usually takes many years to cause noticeable damage, she argues.

Szer does find some comfort in the new results, however. The researchers employed very sensitive tests that should have picked up subtle changes that could precede obvious cognitive disturbances, she says.

In 1991, Szer and her colleagues reported on 36 children diagnosed with Lyme disease between 1972 and 1981 who had not received treatment until at least 4 years after symptoms began. By the late 1980s, only the two participants diagnosed with bacteria in their spinal fluid had cognitive difficulties, she says.

Studies reporting that infection with the Lyme disease bacterium leads to mental ills in treated and untreated adults aren't conclusive, Adams and his colleagues say. The studies' methodologies were sometimes weak, and researchers often selected patients with neuropsychological complaints.

Scientists have fingered a new carrier of *B. burgdorferi*: dogs. A new study demonstrates that a deer tick feeding on an infected canine will pick up the bacterium, Thomas N. Mather of the University of Rhode Island in Kingston and his colleagues report in the July 15 JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION. The ticks can then infect humans, although the dogs themselves cannot. Not all dogs develop symptoms, Mather adds.

— *T. Adler*

Protein missing in endometriosis cases

A woman diagnosed with endometriosis experiences the frustration of enduring an inexplicable disease. And a woman suffering infertility because of endometriosis experiences the double frustration of being told that pregnancy "cures" the disease — if only she could get pregnant.

It's the ultimate catch-22 situation, says Bruce A. Lessey of the University of North Carolina at Chapel Hill.

But if Lessey and his research team prove correct about the role of a protein known informally as beta-3 — the beta-3 subunit of the vitronectin receptor integrin — they may have taken one step closer to understanding the puzzling nature of endometriosis and its association with infertility.

Though the disease was named in the 1920s, the causes of endometriosis remain poorly understood. Recent research, however, has indicated a link between this disorder and exposure to dioxin (SN: 11/27/93, p.356).

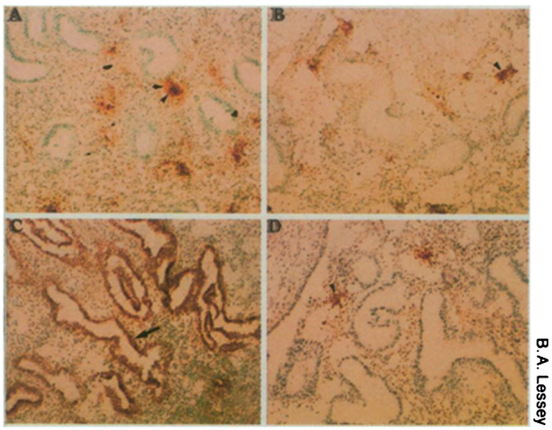
Endometriosis occurs in 2 to 5 percent of all women. In the disorder, the endometrium, or uterine lining, grows where it shouldn't — on the ovaries, fallopian tubes, bladder, urethra, intestines; more rarely, on the kidneys, lungs, and thorax; and rarest of all, on the brain. The chief symptoms are pain, heavy bleeding, and infertility. About 40 percent of infertile women suffer from endometriosis.

In the August JOURNAL of CLINICAL ENDOCRINOLOGY and METABOLISM, Lessey and his coworkers report potentially excellent news for the future of endometriosis sufferers. They find that beta-3 analysis has a "positive predictive value as a nonsurgical diagnostic test for minimal and mild endometriosis." Currently, the only accurate diagnosis of the disease requires a laparoscopy, a procedure involving a "belly-button cut" and insertion of a lighted instrument into the navel.

Lessey and his team analyzed endometrial biopsies of 241 women with regular menstrual cycles. They compared 105 women diagnosed with endometriosis to 116 infertile women with no known endometriosis and 20 fertile women.

In normal, healthy women, Lessey says, beta-3 appears on the endometrial epithelium "like clockwork" on the 19th to the 20th day of the menstrual cycle, corresponding to the body's preparation for implantation and pregnancy.

The researchers collected biopsies from 89 of the infertile controls prior to laparoscopic examination. Of these, 22 displayed an absence of beta-3 on day 19 and day 20. Laparoscopy confirmed minimal endometriosis in 19 of the 22 women, making the beta-3 marker accurate in 86 percent of the cases.



B. A. Lessey

Brown staining represents beta-3; green staining represents absence of beta-3. (A) to (C) show the epithelial cells of a woman without endometriosis: (A) proliferative phase, (B) early secretory phase, day 18, and (C) midsecretory phase, day 22. (D) shows a woman with endometriosis; there is no epithelial staining for beta-3.

However, the team notes, "Not all patients subsequently found to have endometriosis were missing the beta-3 subunit."

Scientists have no clear understanding of how the egg implants in the uterine wall or beta-3's function in that process, though Lessey believes the protein is indeed involved in implantation. However, he cautions that the process isn't simple: Infertility doesn't result solely from an absence of beta-3. "Implantation might be a cascade of molecular events."

Even so, Lessey and his colleagues hope that using beta-3 deficiency as a marker will soon lead to the development of "a cheap and easy test" to diagnose endometriosis. This will reduce the need for laparoscopy, which requires a general anesthetic. A biopsy can be performed in a doctor's office in a few minutes at a fraction of the cost of surgery.

Christos Coutifaris of the University of Pennsylvania Medical Center in Philadelphia calls the findings encouraging, but he remains cautious about making clinical generalizations based upon them. "The patient population he [Lessey] studied is extremely skewed toward endometriosis," he says.

Coutifaris also expresses concern that the 86 percent success rate of beta-3 noted in the study resulted from such a small number of women. "This study, in terms of becoming a valid clinical tool, needs higher numbers," he says. "Take all patients coming into an infertility clinic and get 200 controls and 200 cases."

"However, this study gives us good reason to design a multicenter study," Coutifaris adds. "The data are limited, but they're very exciting." Adds Luigi Mastroianni Jr., also from the University of Pennsylvania, "This opens the window for a glimmer of understanding of how endometriosis affects fertility. I'm sure it will be pursued." — *G. Marino*

Light halo hints at a galaxy's dark matter

There's far more to the cosmos than meets the eye. Astronomers have known for decades that visible matter alone can't account for the rapid rotation of stars in a galaxy or provide the gravitational glue that keeps galaxies bound in a cluster.

Now, a faint halo of light detected from a nearby galaxy is providing astronomers with a new window on some of the missing material — dark matter thought to account for at least 90 percent of the mass of the universe.

The halo, which surrounds the spiral galaxy NGC 5907 in the direction of the constellation Draco, averages only one-hundredth the brightness of the night sky and requires one of the largest solid-state detectors available in order to be seen.

But its extreme dimness isn't what intrigued a team of astronomers that includes Penny D. Sackett of the Institute for Advanced Study in Princeton, N.J., and Heather L. Morrison of the National Optical Astronomy Observatories in Tucson. They found that the surface brightness of the halo, measured from its center to its visible edge, declines far more gradually than the more luminous halos observed around many other galaxies.

The gradual decline in light doesn't match the distribution of visible matter in the spiral disk of NGC 5907. Instead, it appears to match the distribution of dark matter that several other astronomers have calculated should reside throughout the visible disk and beyond. Sackett, Morrison, and their colleagues report their work in the Aug. 11 NATURE.

"The researchers have described compelling evidence that a component of optical light has the same distribution as the dark matter inferred from the dynamics of the galaxy," comments Leonard Searle of the Carnegie Observatories in Pasadena, Calif.

"This [faint glow] is what we had been hoping would show up for two decades, and we've finally had the technology to detect it," adds Vera C. Rubin of the Carnegie Institution of Washington.

Rubin and other researchers gathered evidence more than 2 decades ago that the visible stars equal a mere fraction of the total amount of mass in galaxies. They observed that stars in spiral galaxies like the Milky Way move at a constant speed — regardless of whether they lie near the center or the outskirts of those galaxies.

Such behavior is a dead giveaway that the visible disk of these galaxies lies embedded in a much larger and more massive halo of unseen material. If it weren't, stars farther from the galaxy's center would experience a smaller gravitational tug and move more slowly.

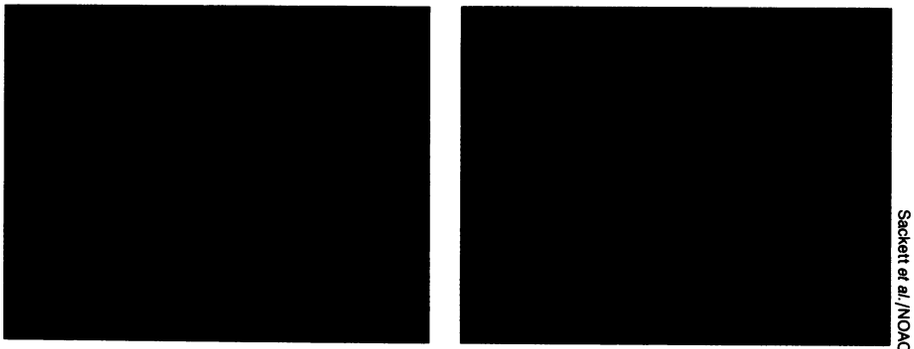
The marked discrepancy between the amount of visible matter in NGC 5907 and the rotation rate of its stars provided astronomers with a promising location for a telltale halo, Rubin notes. But with only one such halo observed, it remains unclear whether the phenomenon is unique to NGC 5907 or is a general property of other spiral galaxies, she cautions.

Until researchers can complete observations at several wavelengths, they offer two explanations for the faint halo: The stars that emit the faint glow either trace the distribution of dark matter or make up the dark matter itself.

For the latter scenario to hold true, the halo stars would barely shine and could have a mass no larger than one-tenth that of the sun. Astronomers have inferred the existence of a few such objects in the Milky Way (SN: 9/25/93, p.199), but the number in NGC 5907 would have to be far greater, Sackett notes.

If the halo stars are dark-matter tracers, they would have a more normal mix of masses. But why should these stars trace the unseen matter?

Sackett suggests that they are elderly stars that formed early in the history of the universe, just as dark matter had settled in but before the onset of the violent events thought to have shaped the brighter, visible portions of the galaxy. — *R. Cowen*



Sackett *et al.*/NOAO

Left: The halo can't be seen in this image of the galaxy NGC 5907. Right: To make the halo visible in this false-color image of NGC 5907, astronomers subtracted the light estimated to come from the galaxy's disk. The halo actually extends to the core of the galaxy, but researchers masked that region to minimize errors in the appearance of the halo.