

Small-world social networks have important implications. "If you need to spread information through a network quickly and reliably, this may be a good architecture," Strogatz says.

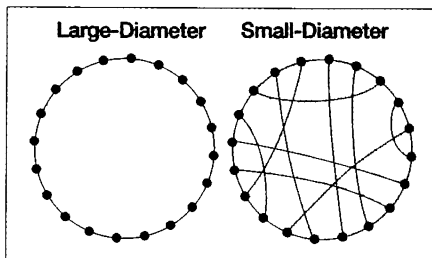
For example, creating shortcuts by sprinkling a few diversely connected individuals throughout a large organization could dramatically speed up information flow between departments.

On the other hand, because only a few random shortcuts are necessary to make the world small, subtle changes to networks have alarming consequences for the rapid spread of computer viruses, pernicious rumors, and infectious diseases, Strogatz notes.

The standard assumption in most models of disease transmission is that every individual has an equal probability of infecting every other individual. That's clearly flawed, Levin says.

"It is especially bad for sexually transmitted diseases, for which most individuals have few contacts and a few have many," he argues. "Those so-called super-spreaders shorten the median distances among individuals, essentially making the world a small one and dramatically increasing propagation rates."

Subtle differences in connections may



A graph consisting of points connected in a ring is said to have a large diameter because a message may have to pass through many intermediate points to get to its destination (left). Mathematicians have proved that adding links between randomly selected points creates a network (right) with the same, small diameter as a comparable random graph.

also have a significant effect on the ability of networks of interacting members—whether people, nerve cells, or crickets—to coordinate behavior.

In networks of neurons, for instance, the cells sometimes display waves of activity and at other times synchronized behavior. Synchrony is characteristic of networks with high connectivity, Chow says. Indeed, researchers modeling neural networks typically assume that every neuron

is connected to every other neuron.

Assuming complete connectivity, however, may be an unnecessary simplification, he notes. The behavior of small-world models suggests that changes in just a few links within a mainly regular network might be enough for regions of the brain to switch from waves to synchrony or vice versa.

Collins hopes to look at synchronization effects across a network by using about 100 students, each one working at his or her own computer terminal. "Each screen would show two circles that move along a line," he says. One circle would be controlled by the user of the terminal, and the other would represent the average position of all the circles. The goal would be for each student to make the circles overlap.

"We would change the coupling, going from a regular network through a small-world network to a random network, to study the effect of network architecture on synchronization times," Collins says.

In the meantime, Watts hasn't returned to his work on crickets. "I'm like a kid in a candy store," he says. "This work has relevance to so many different areas."

In more ways than one, it truly may be a small world after all. □

Biomedicine

Drug prevents herpes return to the eye

About 400,000 people in the United States suffer from a potentially blinding herpes infection of the eye that tends to recur. A new study suggests a way to thwart the herpes simplex virus and prevent loss of vision.

Kirk R. Wilhelmus of the Baylor College of Medicine in Houston and his colleagues studied 703 people who had reported a previous herpes infection of the eye.

Although the immune system may clear the initial disease, it often doesn't kill the herpes simplex virus, which can remain in hiding for months or even years—causing another round of disease when it revs up again.

The virus can also infect the mouth or genital region. The drug acyclovir prevents recurrence of herpes disease there. Could acyclovir block a flare-up of the disease in the eye as well?

To find out, the researchers gave approximately half the study participants 400 milligrams of acyclovir twice a day for a year, while the controls received a placebo pill. Herpes infections to the eye were recorded.

The researchers observed that acyclovir reduced the recurrence of herpes infection of the eye by 41 percent during the year of treatment. After the acyclovir treatment ended, the number of recurrences increased to match that of the control group. Wilhelmus and his colleagues report their findings in the July 30 *NEW ENGLAND JOURNAL OF MEDICINE*.

The team also noted that the therapy lowered by about 50 percent the risk of a return of the most severe form of the disease, stromal keratitis. Stromal keratitis occurs when the virus invades the inner layer of the eye's cornea where it can lead to scarring and loss of vision.

The study detected no side effects that could be attributed directly to the drug.

The findings suggest that people who have had stromal keratitis should consider taking acyclovir over the long term, per-

haps even for life, to prevent a recurrence, says Scott Whitcup of the National Eye Institute in Bethesda, Md. —K.F.

More babies sleep safely

The public health message telling caregivers to put babies to sleep on their backs has paid off: A new study reports that between 1992 and 1996 the frequency of babies being put to sleep on their stomachs dropped by 66 percent.

Previous research had suggested that babies who sleep on their stomachs face a greater risk of sudden infant death syndrome, or SIDS. It is the leading cause of death for U.S. infants between the age of one month and one year.

Marian Willinger of the National Institute of Child Health and Human Development (NICHD) in Bethesda, Md., and her colleagues interviewed about 1,000 caregivers of infants annually.

The team found that infants were placed on their stomachs by 70 percent of caregivers in 1992—before the American Academy of Pediatrics recommended that babies be put to sleep on their backs or on their sides. In 1996, just 24 percent were putting infants to sleep on their stomachs, the team reports in the July 22/29 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

However, Willinger's study and two others that appear in the same issue indicate that greater educational efforts may be needed. A study by Ruth A. Brenner, also at NICHD, discovered that about 40 percent of low-income, inner-city mothers put their infants to sleep in the hazardous stomach position.

Moreover, Samuel M. Lesko of Boston University reported that almost 30 percent of 7,796 mothers across a range of income levels had switched their babies from the back to the stomach sleeping position at about 3 months, an age when they are still vulnerable to SIDS. The younger moms were more likely to change their baby to the less safe position. —K.F.