

## Gagged killer bugs stay sweet

PREVENTING bacteria "talking" to one another can stop them becoming killers, say microbiologists in Texas. The finding may lead to new approaches to fighting infections—a welcome development as bacteria evolve resistance to antibiotics.

Abdul Hamood and Kendra Rumbaugh of Texas Tech University in Lubbock and colleagues studied *Pseudomonas aeruginosa*, which can infect wounds and kill patients with severe burns. If anaesthetised mice with small scald wounds are infected with *P. aeruginosa*, 95 per cent of them die within 48 hours. But when the team inoculated animals' wounds with bacteria in which communication genes had been knocked out, the mortality rate fell to 6 per cent. The bacteria also failed to spread.

The genes involved produce enzymes that churn out molecules called autoinducers. When enough bacteria are present, the concentration of autoinducers passes a threshold level that causes the bacteria to switch on virulence genes, allowing them to spread through the host.

This allows bacteria to build a bridgehead before running riot, says Barbara Iglewski of the University of Rochester, New York, who collaborated on the project. In doing so, they may avoid attracting the attention of the immune system.

Hamood hopes it will be possible to find drugs that block bacterial communication. "This approach does not kill cells, it blinds them," he says. "There is no pressure for mutant bacteria to become resistant to treatment." Nicole Johnston

Source: *Infection and Immunity* (vol 67, p 5854)

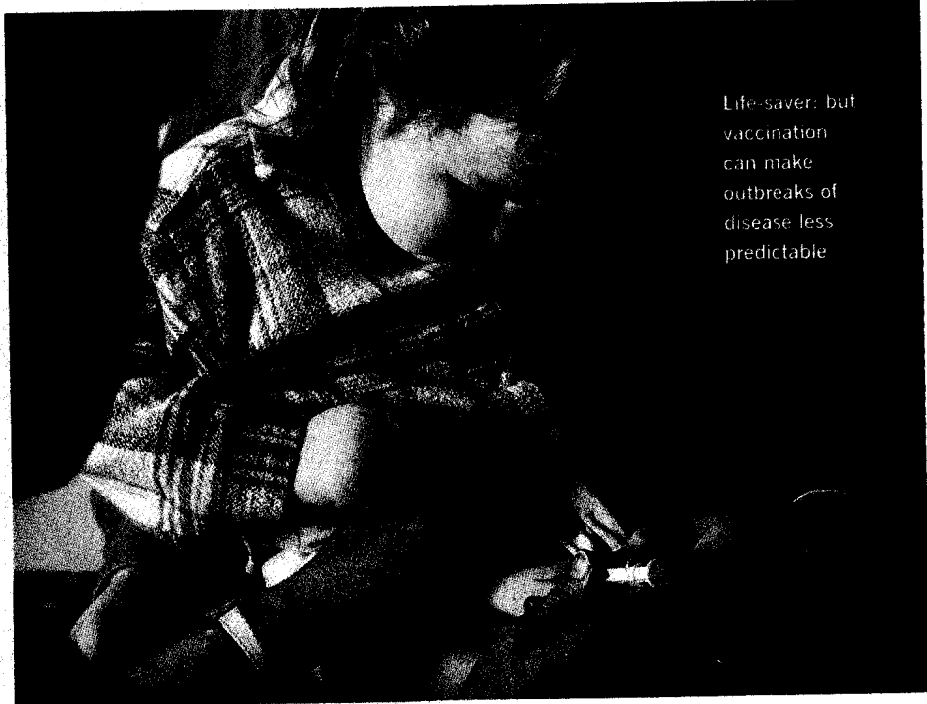
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Life-saver: but vaccination can make outbreaks of disease less predictable

Tony Stone

## A shot in time

### Vaccines need some neat choreography to eliminate disease

VACCINATING children against diseases that normally spread in synchronised waves can make outbreaks become more sporadic, according to scientists in Britain. They warn that this effect should be taken into account, as diseases that break out in irregular patterns are hard to eradicate.

Pejman Rohani and his colleagues at the University of Cambridge made this discovery after collecting information on measles and whooping cough outbreaks in 60 cities, towns and villages across England and Wales between 1944 and 1994. In Britain, mass vaccination programmes began in 1968 for measles and in 1957 for whooping cough. When the researchers examined records from before and after immunisation began, they realised that the two diseases showed opposite patterns.

Before vaccination, measles broke out in periodic, synchronised waves all across England and Wales. Every two years, most cities would simultaneously experience a measles outbreak. After immunisation, the cities had fewer outbreaks, which appeared irregularly and not in all cities at once.

But whooping cough showed the opposite pattern. Before vaccination, individual cities had their own epidemics, which sometimes occurred every two years and sometimes every year. After vaccination programmes began, however, cities had simultaneous outbreaks every three and a half years. "To find the reverse patterns is very exciting," says Rohani.

He thinks the reason for the difference is that people with measles and whooping

cough are infectious for different lengths of time, with various consequences. For instance, children with measles are infectious for about five days, so school holidays tend to quash outbreaks, whereas infections spread quickly during term time. This helps synchronise the disease. Vaccinations tend to randomise this pattern.

But kids with whooping cough are infectious for around two weeks, so synchrony doesn't arise naturally. One reason vaccination makes outbreaks synchronise might be that children are older and travel around more by the time they contract the disease. "This study tells us that details matter," says Rohani.

The experiment has intrigued scientists interested in disease eradication. While vaccination clearly reduces disease outbreaks, eliminating a disease becomes more difficult if cities have outbreaks at different times. This study suggests that vaccination might in some cases make a disease more difficult to eradicate, says Ottar Bjørnstad of the National Center for Ecological Analysis and Synthesis in Santa Barbara, California.

Rohani speculates that giving vaccines in pulses rather than all at once might allow diseases such as measles to remain synchronised, improving the chances for eradication. But scientists will need to look at each disease individually. "We should exercise caution," Rohani concludes. "You can't necessarily take the lessons from one disease and apply it to another." Nell Boyce

Source: *Science* (vol 286, p 968)