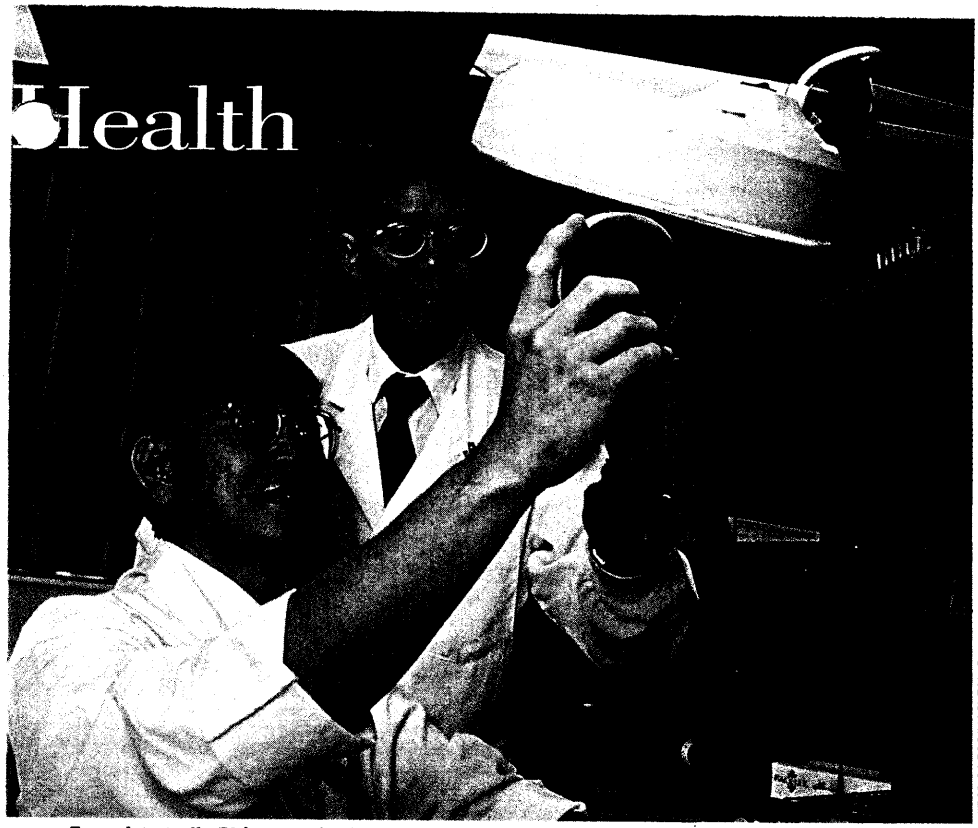

PETER BREGG/MACLEAN'S

Fong (seated), Chiu: rabbits infected with a common bacterium developed arterial disease

Heart-stopping bug

Conventional wisdom fingers smoking, high blood pressure, high cholesterol, diabetes and age—combined with a genetic predisposition—as the prime factors associated with heart disease. But it does not explain why atherosclerosis—the clogging and hardening of arteries that leads to a heart attack—afflicts many people who appear to be free of those risks. Now, more than 3,000 people with a history of heart attacks will take part in clinical trials in Europe and North America to answer the nagging question: could heart disease be infectious?

While still highly controversial, the evidence that patients can "catch" heart disease in much the same way they would catch a cold has become compelling. The Toronto portion of the trials is headed by Dr. Bill Fong, director of infectious diseases at St. Michael's Hospital. He is a member of a research team that published new evidence early this year that the villain in many otherwise mysterious heart attacks is a common bacterium, *Chlamydia pneumoniae*. That respiratory bug affects 75 per cent of the population at some point, causing cold or flu-like symptoms and some cases of pneumonia. "Up to 40 per cent of patients with cardiovascular disease have no known risk factors," says Fong. "*C. pneumoniae* may play a predominant role in this group."

The search for a link between infection and heart disease began early this century. But it was not until the late 1980s that a Finnish study of 4,000 middle-aged men provided strong evidence that *C. pneumoniae* could be a factor. It reported significantly elevated levels of antibodies against the bug (indicating recent or current infection) in 70 per cent of the men who had heart attacks, compared with high levels in just 17 per cent of the men in the group who did not. Subsequent studies in Argentina and Britain have supported those findings and shown promising results from treatments with antibiotics.

Can people 'catch' a heart attack like they catch a cold or the flu?

Fong and several colleagues provided what they consider the strongest proof to date that *C. pneumoniae* is not simply an innocent bystander, but may actually cause heart disease. When they infected 11 rabbits with *C. pneumoniae*, they found that, within just two weeks, two of the animals had the fatty buildup in their aortas that is the early hallmark of atherosclerosis. Uninfected rabbits from the same group and others infected with another pneumonia-causing bacterium remained plaque-free.

That evidence is consistent with other research suggesting that atherosclerosis is the body's response to injury. According to that scenario, blocked arteries are the end result of a chain reaction provoked when trauma or some other cause—possibly infection—triggers the immune system. "Cholesterol is touted as the culprit but it's really a minor player," says Jim Mahony, director of the virology lab at St. Joseph's Hospital in Hamilton and one of Fong's fellow researchers. "People without elevated cholesterol and other risk factors have heart attacks. Atherosclerosis is really due to a number of factors, and this bacterium is one of those factors."

If *C. pneumoniae* bacteria are present when immune cells flock to an injury site, says Mahony, they get lodged in the smooth muscle layer of the artery. Then, according to another member of the research team, St. Michael's Hospital pathologist Dr. Brian Chiu, "the bacterium could trigger an immune response that stimulates a lot of changes in the blood vessel wall." Among them: formation of blood clots and the proliferation of smooth muscle cells thickening the wall and trapping fats, cholesterol and other substances in what Mahony calls a "big ugly mess."

Bacterial infection may also help explain the role of smoking in heart disease, says Fong. The strongest link between *C. pneumoniae* and atherosclerosis has been observed in smokers. Researchers suspect that, because smoking suppresses immune defence mechanisms in the respiratory tract, it may allow *C. pneumoniae* to invade the lungs. Once inside host cells, the bacteria have easy access to the heart because of its proximity.

The medical community so far has regarded the correlation between cardiovascular disease and *C. pneumoniae* with cautious skepticism. But the same was true of evidence in the early '80s that bacteria cause peptic ulcers. Critics insisted that ulcers were the product of stress, spicy foods and excess stomach acid. But Australian scientist Barry Marshall put his contrarian theory to the test, drinking a cocktail of the bacteria *Helicobacter pylori*. Within days, he developed an ulcer that he subsequently eradicated with antibiotics and an antacid—thereby revolutionizing ulcer treatment for millions.

While some early studies of antibiotics and atherosclerosis look promising, researchers expect to learn much more from the large-scale trials. Half of the 3,000-plus patients will receive 12 weeks of antibiotic treatment, the others a placebo. Then all will be monitored for 2 ½ to three years for the recurrence of heart attacks or strokes. In the meantime, Fong advises against other heart disease patients taking antibiotics for this purpose until there is better evidence to support the treatment. Given the potential of providing enormous benefits for almost half the sufferers of heart disease, the results will be anxiously awaited.

NICOLE JOHNSTON