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Tiny Bugs Cause Insidious Health Damage: Viruses, Bacteria, May Cause Everything from Cancer to Obesity

By Charlene Laino 08/12/2007

Evidence is mounting that a variety of common germs long thought to cause only mild, short-lived illnesses such as the flu play a role in causing chronic health problems ranging from allergies, asthma and arthritis to obesity, heart disease and cancer.

Long after one recovers from the microbe's initial insult, viruses, bacteria and other germs silently chew away at the body's tissues and organs, causing insidious, permanent damage, experts believe.

Microbe hunters now estimate that anywhere from one third to more than one half of chronic diseases will eventually be explained by infection with a variety of microorganisms. They point to new research that links germs to some forms of infertility, kidney disease, diabetes, stomach problems and even obsessive-compulsive disorder.

It wasn't easy getting the medical community to accept such a paradigm shift in thinking. But new testing methods that allow molecular biologists to detect the footprints of the microscopic creatures long after any symptoms disappear are slowly winning over even the most recalcitrant.

The findings have enormous implications for treatment, suggesting that, in many cases, anti-viral drugs, antibiotics and vaccines may be the best bet, germ scientists say. They also point to a role for anti-oxidant vitamins, which can sop up some of the damaging molecules that the bugs leave in their wake.

No one can avoid the myriad microorganisms. Within minutes of birth and continuing throughout our lives, our bodies are exposed to virus after virus, bacterium after bacterium. But under normal circumstances, the body's natural defenses fight off harmful microbes, explains Gail Cassell, one of the nation's foremost virus hunters.

But when our immune systems are weakened, when our normal defense barriers are not intact, or when we come in contact with a highly invasive infectious agent that is either new to our bodies or present in large numbers, the balance shifts; in favor of the microbes, says Cassell, chairman of microbiology at the University of Alabama, Birmingham.

Modern living has helped to tip the scales in favor of the tiny, microscopic bugs, she adds. International travel, misuse and overuse of antibiotics, and air pollution, to name a few, all improve the efficiency by which germs spread from person to person and place to place.

Exactly how germs act to cause chronic disease is still a mystery. But scientists believe that the microbes may stimulate white blood cells to aggregate, causing the chronic inflammation that has now been implicated in asthma, allergies, heart disease and other disorders.

Alternately, the bug may induce a so-called autoimmune response, says Dr. Vincent Fischetti of Rockefeller University in New York. "There are molecules on the surface of bacteria and viruses that resemble human versions of these molecules", he explains. "When infected with these organisms, certain people respond by producing substances that attack their own tissue".

In trying to fight off an infection, in other words, your body's defense cells are tricked into attacking the healthy tissue. Among the microbe-disease links now suspected or proven: Ulcers. After years of being shunned, Dr. Barry Marshall's theory that ulcers can be caused by the bacteria *Helicobacter pylori* is now accepted medical doctrine. "The link between infectious diseases and cancer is becoming increasingly clear", Cassell says. According to the World Health Report, up to 84 percent of certain cancers, notably, stomach, cervical, and liver, are attributable to a variety of germs.

About 550,000 new cases of stomach cancer each year are attributable to *Helicobacter pylori*, the same bacterium that causes ulcers. Human papilloma virus, a sexually transmitted infection of the cervix, confers a very high risk of developing cervical cancer. And over eight in 10 cases of liver cancer are thought to be caused by infection with the hepatitis B or C viruses.

A so-called adenovirus, the same type of germ that causes the common cold, may be to blame for the excess pounds you can't seem to shed, according to Nikhil Dhurandhar of the University of Wisconsin in Madison. In a study of 154 obese people, 15 percent had evidence of infection with an adenovirus called Ad-36.

Baltimore scientists reported this year that they have found the first hard evidence that viral infections can cause asthma and allergies in humans, suggesting that vaccinations against the viruses could prevent the diseases.

In test-tube studies of human cells, the researchers showed that weak viral infections can cause immune system cells called B cells to produce immunoglobulin E or IgE, a protein that orchestrates the reactions that cause allergies and many cases of asthma.

Still other studies have implicated mycoplasmas, germs of intermediate size between viruses and bacteria, and the lung bacteria *pneumoniae* in asthma, Cassell says.

Evidence is mounting that coronary heart disease may be caused in part by inflammation that silently simmers away for years inside the blood vessels, and that chronic infection with common bacteria or viruses may play a role in causing the chronic inflammation in the first place. Among the suspected culprits: the ulcer-causing bacteria *H. pylori* or herpes virus, or even chronic tooth decay.

The common respiratory bug *Chlamydia pneumoniae* has been linked in new studies to arteriosclerosis, or hardening of the arteries. And still other studies have shown that regrowth of plaque in patients who have undergone surgery to open up clogged arteries may be spurred by cytomegalovirus a bug found in almost two out of three elderly Americans.

New evidence suggests that both the common respiratory bug *Chlamydia pneumoniae*, as well as another type of germ called mycoplasma, can cause arthritis. The findings may explain why so many arthritis patients get relief from joint pain and swelling after antibiotic treatment.

Cassell's team has found that mycoplasmas can live in a woman's reproductive tract, causing infertility, premature birth and spontaneous abortion.

In perhaps the most startling finding off all, researchers recently found that infection with group A *Streptococcus*, the same organism that causes strep throat, can cause this psychological disorder, Fischetti says.

And the list will keep growing, predicts maverick researcher Marshall, whose finding of a link between bacteria and ulcers spurred much of the new research. "The scientific community moved so rapidly into high-tech medicine in the 1980s that it overlooked ordinary things, such as infections, that can cause disease", he says. "But now that we're looking, we may find infections explain a significant proportion of all disease".