MICROBIOLOGY

Joan Arehart-Treichel reports from the annual meeting of the American Society for Microbiology in New Orleans

Swine flu may get us yet

The swine flu threat may not be over, says Ginger Hinshaw of St. Jude Children's Research Hospital in Memphis.

She reports that swine flu viruses taken from pigs this year and those taken last year from military recruits in Fort Dix, N.J., have the same membrane proteins on their surfaces. This result suggests that the human viruses and the swine flu viruses may have had a common origin. Furthermore, during the last year, studies on pigs in 21 states suggest that a sizable fraction of the herd had been exposed to swine flu virus. About 25 percent of the pigs tested had antibodies to swine flu virus in their blood. With the help of the World Health Organization, Hinshaw has determined that swine flu in pig herds, in countries other than the United States, is minimal.

Hinshaw concludes that since swine flu is so prevalent among American swine herds, the possibility of a human epidemic still is pending. She advocates efforts to control this virus in swine by vaccination or changes in husbandry practices.

And even if swine flu does not threaten Americans on a widespread basis, protecting swine against the flu may still be worthwhile. The economic loss to swine producers from swine flu and other viruses is currently unknown.

Chemotaxis and disease

Chemotaxis is cell movement toward or away from various chemicals. For bacteria, chemotaxis provides means for seeking nutrients and favorable environments. Ben Allweiss and colleagues at the University of Michigan wondered whether such bacterial behavior plays a role in human intestinal disease—more specifically, they asked if chemotaxis affects colonization of the intestinal wall by bacterial pathogens.

They find, in the test tube, that chemotactic bacteria usually are more successful in colonizing intestinal tissue than are nonchemotactic bacteria. However, when chemical attractants are added to the test-tube fluid, the chemotactic bacteria prefer the chemicals to the intestinal tissues.

Thus chemotactic behavior may be crucial in the microecology of the intact gut, and it may be important as a disease factor. For instance, as infection begins, an intestinal pathogen is propelled rapidly along the small intestine so that its contact with any particular area of the intestinal surface is brief. There, a chemotactic bacterium's ability to quickly approach and adhere to the intestinal wall may be of great importance.

The researchers also suggest that eating substances that attract certain intestinal pathogens (for example, the *E. coli* that causes travelers' diarrhea) might help prevent diseases caused by those pathogens. The bacteria would head for the attractants in food rather than for the intestinal wall. Whether such preventive medicine really will work, however, remains to be tested.

Prospecting with microbes

For a quarter century, microbes have been observed growing over oil fields. The bacteria can "feed" on trace amounts of hydrocarbon gases that waft up from many oil deposits. Though researchers have sought to locate valuable oil deposits by using such bacteria, it has been difficult to collect and analyze them.

Now, A.D. Murray and A. R. Barringer of Barringer Research Limited in Rexdale, Ontario, report that, with helicopters flying at low-levels and equipped with radiometric and manometric instruments, they have found methane-, ethane- and propane-using bacteria in surface soils and surface soil aerosols in a variety of oil-producing areas throughout North America. The microbes appear to grow over all of the oil fields tested, ranging from heavily forested to semiarid regions and from freezing to hot, dry conditions.

The results, they believe, provide a basis for developing an airborne exploratory tool, one which could be used to prospect for oil in deserts, tropics and other hard-to-reach areas.

Immunizing newborns against herpes

Of American newborns who are infected with herpes virus as they pass through their mothers' birth canals, one third die, one third suffer severe damage and one third recover. Now T.K. Hughes and his colleagues at the University of Texas Medical Branch in Galveston report a promising approach to prevention of the devastating effects.

First they found that giving specific rabbit antibodies against herpes virus to newborn mice protected them from an experimental infection, whereas newborns not treated with antibodies died. Then the researchers tested commercially prepared human blood globulin (antibodies) in neonatally infected mice. Protective effects were similar to those afforded by rabbit antibodies.

In previous unsuccessful attempts to treat herpes-infected human infants with human serum globulin, Hughes and his co-workers suspect that the amount of antibody in the serum was too low. However, they believe that serum from donors with high levels of antibodies should be effective. The investigators surveyed antibody levels in blood from people in southeast Texas. They found that a few people in the general population (about 1 percent) have large amounts of antibodies and presumably could be used as donors to provide immune-protection for herpes-infected newborns.

Interferon and asthma

Upper respiratory tract viral infections sometimes precipitate asthma attacks. Shiroh Ida and colleagues at the National Institute of Dental Research suggest a mechanism whereby this happens. Asthma involves release of histamine from blood cells, known as basophils, when they are stimulated with ragweed antigen or antibodies to the antibody class known as IgE.

Ida and colleagues found that basophils do not release histamine in the presence of viruses. However, if basophils are exposed to viruses and then challenged with ragweed antigens or antibodies to IgE, significant histamine is always released. This holds for both inactivated and infectious viruses.

To Ida, these findings suggested that substances in the culture fluids trigger histamine release. The research team suspected interferon—a protein that is released in the bloodstream to fight viral infections. Subsequent experiments show this is the case.

When basophils are incubated with inactivated viruses, interferon appears in the cell-culture fluid. When this fluid is added to fresh cultures of basophils, they release histamine. Interferon may thus cause asthma attacks during viral infection.

Microbes: A new drug probe

Bacteria often break down drugs in the same manner people do, reports John P. Rosazza at the University of Iowa.

Because animal or tissue-culture studies of drug metabolism have various drawbacks (for example, they may not mimic the human situation exactly), Rosazza suggests bacterial assays as a valuable tool for studying human drug metabolism. Results from experiments with bacteria are easily reproduced, and the drug breakdown products can be isolated. Bacterial assays may be especially useful in the search for new drugs.