

MEDICINE

Typhoid Carriers Persist

Typhoid fever antibiotics that successfully cure the disease do not reduce the number of carriers among treated patients, Faye Marley reports.

► THE TYPHOID carrier remains a "real and continuing threat" in spite of antibiotics.

Dr. Joseph E. Smadel of the division of biologics standards, National Institutes of Health, said in Bethesda, Md., that chloramphenicol, the antibiotic whose successful use for treatment of typhoid fever he discovered, "does not reduce the incidence of carriers among treated patients to less than that found among untreated cases."

Numerous workers have tried combinations of chloramphenicol therapy with other antibiotics or with removal of the gall bladder, Dr. Smadel said in an NIH lecture. Although useful in some cases, no particular plan has gained wide acceptance.

At NIH, where Dr. Smadel is chief of the Laboratory of Virology and Rickettsiology, a typhoid-tissue-culture model was developed in an effort to throw light on reasons why the chronic typhoid carrier is so difficult to cure with antibiotics.

Disappointingly, Dr. Smadel and his co-workers found that although antibiotics played a major role in aiding cells to clear themselves of *Salmonella typhosa*, the bacterial species causing typhoid fever, "it is likely that they do nothing more than hold the intruders in abeyance while natural defense mechanisms of the cell gain the upper hand."

Typhus carriers appear to be more numerous than typhoid carriers, Dr. Smadel pointed out. About two per cent of the patients who survive typhoid become carriers, whereas one study showed that about seven per cent of a selected group of typhus patients became carriers.

Louse-borne typhus has not occurred in the U.S. for many years but a few cases of an infection known as Brill-Zinsser disease flare up each year as a recurrence or "recrudescence" of old typhus infections. Typhoid fever has been reduced in the U.S. to about 800 cases a year, but both typhus and typhoid epidemics continue in other parts of the world.

Investigators in Boston and Chicago have reported that 20 to 30 per cent of the elderly immigrants to the U.S. who were born and spent their early years in typhus areas of Europe still possess antibodies against typhus. It has been shown that cases of Brill-Zinsser disease are caused by this immigrant population, and it is believed that these individuals are still harboring the *Rickettsia prowazekii* organism that causes typhus.

Both typhus and typhoid are acute infectious disease with rash, fever and mental depression. Dr. Smadel was the first to demonstrate that chloramphenicol is effective against both these diseases as well as Rocky Mountain spotted fever.

Typhoid and typhus provide contrasting examples, Dr. Smadel explained in his lec-

ture on intracellular infection and the carrier state. Typhoid carriers shed organisms that can be readily detected by appropriate laboratory techniques, but the typhus carrier is a "silent" type hard to recognize unless the clinical disease is present.

It is only when the typhus carrier has a recurrence of typhus that his potential danger becomes real, and only when the patient and the community are infested with lice that an epidemic of typhus occurs.

Dr. Smadel explained the continued existence of the typhus- and typhoid-causing organisms in the carrier state by assuming that these organisms have "taken sanctuary" inside tissue cells where antibodies cannot reach them.

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SPACE

Relay Satellite and Explorer XVI Launched

► THREE SATELLITES were launched during December—the Relay communications satellite, Explorer XVI to measure micrometeoroids in space and the navigational satellite, Transit V-A, bringing the 1962 space calendar up-to-date (SNL, 82:24, Dec. 15, 1962).

However, the main December space achievement was the successful scanning of Venus by Mariner II, which transmitted information to earth about earth's nearest space neighbor on Dec. 14, when it passed within 21,000 miles of the planet. The transmission set a long-distance record of some 36 million miles. Scientists will be busy for several months interpreting the information telemetered from Mariner II about the cloud-shrouded planet.

The Relay communications satellite, expected to be a replacement for the now defunct Telstar satellite, did not live up to expectations, the difficulty being that its power supply voltage was too weak to handle television transmissions.

Explorer XVI was launched into orbit on Dec. 16 from Wallops Island, Va., with a perigee of 466 miles and an apogee of 733 miles at an inclination of 52 degrees from the equator. Time for one orbit was reported as 104 minutes. The newest satellite's job was to count micrometeoroids, the tiny particles that speed rapidly through space.

Transit V-A was launched from Point Arguello, Calif., in an excellent orbit varying from 375 to 395 nautical miles above the earth. However, failure of an electronic command receiver is preventing operational use of the Navy's navigational satellite, although Transit V-A is expected to be useful for test purposes.

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Proof of Virus Cause of Human Leukemia Close

► WAYS of proving the theory that viruses cause human leukemia appear closer through discovery of a hitherto unknown similarity in virus shapes.

Three scientists at the National Cancer Institute in Bethesda, Md., found an important resemblance between the tadpole-like shape of bacterial viruses and an animal leukemia virus.

Many viruses are known to cause various forms of cancer and other diseases in animals, but animal virus particles have not previously been reported to have the six-sided head and well-developed tail.

A study is now going on at the Institute to determine whether the leukemia virus acts like the virus that attacks bacteria by attaching its tail to the single-cell organism and injecting it with disease-causing nucleic acid.

The investigators believe that an understanding of how the leukemia virus does its work in animals would help researchers find ways of proving that viruses cause human as well as animal leukemia.

Drs. Albert J. Dalton and John B. Moloney share the credit for the discovery with Dr. Francoise Haguenu of the College of France in Paris, who worked with them on a recent visit to NCI. Their work is reported in the Journal of the National Cancer Institute, Dec. 1962.

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National Cancer Institute

LEUKEMIA VIRUS—These tadpole shapes are mouse leukemia viruses, approximately 150,000 times the actual size. They provide an important clue to the cause of human leukemia.