SCIENCE NEWS

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TOXIN TREATMENT IN THE PREVENTION OF PNEUMONIA

PNEUMONIA attacks may be warded off by hypodermic injections of the poison produced by the pneumonia germ, it appears from studies by Dr. Arthur F. Coca, professor of immunology at the Cornell University Medical College. He reported his investigations of this germ to the American Association of Immunologists meeting this week in Washington.

"The pneumococcus produces a substance which is highly poisonous for human beings but much less so for lower animals," he explained. Apparently this toxin may be the important injurious agent of the pneumococcus, in which case Dr. Coca's experiments indicate that it will be easy to give people resistance or immunity to pneumonia as is now done for smallpox, typhoid fever and diphtheria. When this poison or toxin is injected into human beings, an antitoxin is formed in the blood which enables the individual to resist the toxin, giving him what physicians call immunity to it. Two injections of toxin produced immunity in two thirds of the susceptible children within three weeks. Skin tests of patients who were recovering from pneumonia showed that their blood serum has been found to neutralize the toxin.

NEW DISEASE CAUSED BY A YEAST-LIKE ORGANISM

A CASE of a new and unique disease, caused by a yeast-like organism, was reported by Drs. G. H. Hansmann and J. R. Schenken, of Iowa City, at the opening session on May 9 of the Washington meeting of the American Association of Pathologists and Bacteriologists. The patient was a white man, forty-three years old at the time of his death, according to the doctor's records. For the last sixteen years of his life he had suffered from a refractory skin ailment. This first appeared on the skin back of his knees in 1916. By 1929 the entire skin was involved. The ailment consisted of a scaly inflammation, underneath which the skin was somewhat thickened and reddened. During 1929 the skin became more reddened and thickened and cracked easily. In June of 1932 hard elevated spots, something like pimples, appeared. Late in July the patient developed a high fever with signs of pleurisy, and died on August 7.

Examination of one of the elevated spots from the skin and one of the lymph nodes, which had become enlarged, showed that both contained a small organism which appeared as a small yeast. This same organism was also found in the lungs and adrenal glands. Guinea-pigs, rabbits, rats and dogs develop the same sort of skin disease when infected with this organism. The yeast-like organism causing the disease is smaller than any heretofore described and probably belongs in the Oidium group. The character and distribution of the lesions in man are unlike any other disease.

THE CAUSE OF ARTHRITIS

A CERTAIN type of arthritis, known to physicians as hypertrophic or degenerative arthritis, results from the "wear and tear" of increasing age and from repeated injury to the joints, Drs. Granville A. Bennett and Walter Bauer, of Harvard Medical School, reported at the medical meetings held this week in Washington.

These investigators do not agree that the condition is the result of some inflammatory process. They even found marked changes in the joints, indistinguishable from those of hypertrophic arthritis, in individuals who do not have important symptoms of joint disease. The word arthritis, they pointed out, is probably not the correct one to use for this particular condition, if, as their investigations show, it is nothing more than the degenerative joint changes due to the wear and tear of increasing age. Earlier studies had shown quite clearly that the cartilage of joints has a very feeble, limited ability to regenerate or renew itself. Repeated injury to displaced knee joints did result in certain animals in very marked changes like those seen in human hypertrophic arthritis.

Because of these findings, it was decided to see what changes might take place in human joints subjected to unusual use or repeated injury. For the first part of the problem they studied a single joint which had been subjected to repeated injury or constant use, comparing it with the opposite joint which had not had such use or injury. They found that such injury or constant use was in itself enough cause for marked degenerative changes of the joint.

In a second investigation, they collected and examined, with x-ray and microscope, human knee joints representing various ages from the first to the ninth decade of life. The owners of these joints had never, so far as could be determined, had symptoms of joint disease. With each succeeding decade in life beyond the second, that is, after age twenty, increasing degenerative changes in the joint were seen. The changes were identical to those commonly considered characteristic of degenerative or hypertrophic arthritis.

Finally, the studies showed that arteriosclerosis, popularly known as hardening of the arteries, was not an important factor as the cause of this disease.

CHRONIC ARTHRITIS

A CHEERFUL, optimistic temperament is a great asset for the patient fighting rheumatoid arthritis, Dr. Russell L. Cecil, of New York City, said in a discussion of the prognosis in chronic arthritis at the Washington meeting of the American Clinical and Climatological Association. The prospects of recovery from chronic arthritis, sometimes popularly known as rheumatism, depend primarily on the type of arthritis from which the patient is suffering.

In the case of osteo-arthritis, the characteristic de-

generative changes are permanent and tend to progress slowly. The symptoms resulting from these changes, however, can usually be ameliorated or entirely cleared up by proper treatment. The chances for recovery from rheumatoid arthritis are hard to determine since there are no adequate statistics as to the percentage of permanent recoveries. "The disease never menaces life," Dr. Cecil stated, "but the danger of serious deformity and crippling always exists, especially in neglected cases."

It is in this type of arthritis that the cheerful, optimistic temperament was said to be a great asset. Young people respond to treatment better than elderly patients. Those who have an acute onset seem to have a better chance than those whose symptoms come on insidiously. Much depends on the joints involved, the knees, hips and back offering the greatest difficulty. Finally, the ability and the disposition of the patient to devote himself zealously to the régime and treatment prescribed by his physician is of the greatest importance in forecasting the chances of recovery.

CANCER CELLS

THE size of the cell nucleolus is the distinguishing feature by which a cancer cell may be told from normal cells, according to a report by Drs. William Carpenter MacCarty and Eva Haumeder, of the Mayo Clinic, before the American Association for Cancer Research. A method of distinguishing between normal and cancer cells has long been sought. It is not always possible to tell from its gross appearance whether or not a tumor is malignant.

Surgeons about to remove a tumor generally send a small piece of it down to the hospital laboratory for diagnosis. The pathologist must, within two or three minutes, cut a paper-thin sliver from the piece of tumor tissue, fix it on a glass slide, stain it, examine it under the microscope, and report to the surgical team waiting in the operating room whether or not the tissue is cancerous. But even when examined in this way, cancer cells sometimes look so much like certain types of normal, non-malignant cells that it is extremely difficult to make an accurate diagnosis.

Drs. MacCarty and Haumeder have found that the area of the nucleolus in the cancer cell is much greater than the area of normal cell nucleoli. They conclude that the cancer cell has at least one differential characteristic and that this must be used by those who expect to reduce the mortality from cancer. The nucleolus is a very small but important part of a cell. For their investigations, a special method of measuring this small area was devised.

THE PIGMENTED HAIRY MOLE

THE pigmented, hairy mole appears to be a link in the evolutionary chain between the hairy touch organs of man and other mammals and the colored touch organs of the amphibian-reptilian type of animal, such as the water-snake. In other words, the mole on your neck is closely related to the dark-colored bumps on snake skin. This evolutionary theory was presented by Drs. George F. Laidlaw and Margaret R. Murray, of Columbia University, at the Washington meeting of the American Association of Pathologists and Bacteriologists.

The pattern and structure of these moles does not resemble anything known in normal skin of mammals and it is a faithful reproduction of the colored, elevated and innervated spots of the amphibia and reptiles. In the course of evolution, these colored tactile spots of the snakes and amphibia were replaced in mammals by hair follicles and by mammalian touch cells. In its hair follicle, the mole is mammalian, but in its coloring, elevation and the arrangement of cells and nerves, it is reptilian.

The evolutionary theory explains many obscure points about moles, Dr. Laidlaw said. For instance, it explains why pigmented moles are rare in hairy mammals, such as cats and dogs. Their skin has specialized far beyond human skin in the production of hair. In its relative absence of hair, human skin is closer to the ancestral snake skin, and consequently, as in its pigmented moles, it bears more vestiges of former reptilian life spent half in water and half in air. "Port wine" marks may be explained as vestiges of the tangle of veins of an amphibian skin, dating from the stage when man's ancestors breathed through their skins.

INHERITED RESISTANCE TO INFECTIOUS DISEASES

STUDIES with mice at the Rockefeller Institute, New York, show that resistance to disease is a hereditary trait like color of eyes, hair or skin. Strains of mice highly susceptible to or highly resistant to a given disease may be segregated by selective breeding, Dr. Leslie T. Webster reported at the Washington meeting of the American Association of Pathologists and Bacteriologists.

Starting with a strain of mice 37 per cent. susceptible to mouse typhoid, he selected lines 85 per cent. and 15 per cent. susceptible, respectively. The 85 per cent. susceptible lines were descendants of mice highly susceptible to mouse typhoid, while the 15 per cent. susceptible descended from relatively resistant mice. Resistance factors are dominant, and not sex-linked, Dr. Webster found.

Mice from strains resistant to disease were heavier but not more fertile than the susceptible mice. The tissues throughout the bodies of these resistant mice seemed less sensitive to the organism causing mice typhoid than did the body tissues of susceptible mice. This suggested to Dr. Webster that the hereditary factors giving resistance to disease exercise general rather than local influence in the animal body. These hereditary factors concerned with resistance or susceptibility to disease can operate against a number of but not necessarily all harmful agents. So that an animal, possibly a man or woman, may be born with ability to resist attacks of a number of diseases, but still may be susceptible to a few infectious diseases.

THE INVASION OF THE BODY BY DISEASE GERMS

THE extent to which disease germs can invade the body depends on the amount of inflammation they cause at the

site of their entry, it appears from investigations reported by Dr. Valy Menkin, of Harvard University Medical School, to the American Association of Pathologists and Bacteriologists. By injecting a dye into the body at a place where bacteria had previously been injected, Dr. Menkin found that staphylococci, the organisms that are found in boils, limit the extent of their invasion to a very small area. They do this by causing a rapid inflammation which results in mechanical obstruction of the draining lymphatics, the avenues by which the disease germs, or other foreign matter, might continue their invasion of the body.

The pneumococcus and the fearsome streptococcus, on the other hand, do not cause such rapid obstruction of these avenues. In the case of the streptococcus, Dr. Menkin found the avenues are open for as long as two days. This gives the disease germs a chance to get far in their invasion of the body and probably accounts for the serious effects on the whole system of infection with these organisms. Dr. Menkin was able to determine the speed with which the germs could invade the body by watching the rate of progress of the dye which invaded the body just after the organisms had been introduced. When the dye could not proceed any farther, he concluded that sufficient inflammation had occurred to obstruct the path for the organisms also.

ITEMS

DISCOVERY of bacteria belonging to the Brucella group, which cause undulant fever, in diseased vertebrae of swine was reported by Drs. William H. Feldman and Carl Olson, Jr., of the Mayo Clinic, at the Washington meeting of the American Association of Pathologists and Bacteriologists. The animals did not show any signs of disease at the time of slaughter and the organs were healthy-looking. This discovery gives further evidence that swine are a dangerous source of undulant fever infection for farmers, packing house employees, retail butchers, housewives and others who handle uncooked pork.

WHEN the moon partly entered the earth's shadow last September, as seen from Europe, the shaded part reflected less than a thousandth as much violet light as the ordinary full moon, but it sent back to us about one six hundredth as much infra-red light as the uneclipsed portion. This was determined by photographs taken by Dr. R. L. Waterfield, and just announced to the British Astronomical Association. The earth's atmosphere bends some of the sun's light around into its shadow, and for that reason the shadow, when it falls on the moon and produces a lunar eclipse, is not entirely dark. Because the longer waves of the red and infra-red light pass through the earth's atmosphere more readily than the shorter blue and violet waves, the eclipsed moon usually has a ruddy color. Dr. Waterfield's data show how much of this light is so refracted into the shadow.

AN ingenious robot detective that will "frisk" a man for concealed weapons, register the fact that it has found him and takes his photograph, all without his knowledge, was recently described in an address by O. H. Caldwell, editor of *Electronics*. The device is built around an electron tube. It can be so delicately adjusted that while it will react to a mass of metal as large as a revolver, it will ignore smaller metallic objects which law-abiding men usually have about them, such as watches, coins and bunches of keys. Another device described by Mr. Caldwell counts persons passing through an entrance, no matter how fast they come or how much massed in groups. It does not overlook odd sizes and shapes: when Mr. Caldwell tried to fool it by hiding behind an umbrella as he passed it, he got counted anyway.

THE cyanide bath now widely used for copper plating of steel can be replaced by a new non-poisonous electroplating solution developed by Dr. Colin G. Fink and Chaak Y. Wong, of Columbia University, and reported to the Electrochemical Society meeting in Montreal. A complex copper salt, chemically known as disodium diaquodioxalatocupriate, is used in the new bath, along with sodium sulphate and boric acid. The new method will be available for use in large automatic plating installations where strip steel, standard steel parts, etc., are coated with copper as the first step to other coating. A satisfactory copper deposit is obtained in only one minute with a low electrical current density with the new "oxalato" bath.

MORE progress has been made in the manufacture of lubricating oils during the past few years than in the preceding thirty, Dr. Gustav Egloff, petroleum chemist, stated in an address before the Society of Chemical Industry in New York on May 12. This progress has been brought about by the requirements of the high-pressure motors needed by high-speed airplanes, automobiles and motor boats. New extreme-pressure lubricants have been developed, made up of blends of petroleum oils, vegetable or animal oils and sulphur. Crude oils for lubricants are carefully selected and improvements in the refining process have been made for this particular demand.

A KATYDID'S knees, which are that creature's own peculiar "ears," have given men the novel experience of listening in on that insect's world of sound. The story of how scientists have tapped the hearing circuit of katydids and crickets by placing electrodes against the knees of the insects, amplifying the responses picked up, and listening in on these in an ordinary telephone receiver, was related to the meeting of the New York Branch of the American Psychological Association by Drs. E. G. Wever and C. W. Bray, of Princeton University. The resulting sound was always a sort of "shushing" noise, regardless of the source of the sound. Human speech lost all characteristic qualities except the rhythm, which was preserved. But the katydid is apparently deaf to the ordinary sounds of our world and hears principally those that are beyond the reach of human ears. Sounds of frequency below 800 cycles produced no response even when very loud. But the higher frequencies, even up to 45,000 cycles per second, were picked up. The limit of man's hearing is usually about 20,000 cycles—the shrillest note of the peanut whistle.