

MEDICINE

# Chemical Barrier Holds Toxin From Reaching the Brain

## Diphtheria Toxin Among Those Excluded; Blood Will Carry Cobra Venom and Dysentery Toxin Past Barrier

**D**IPHThERIA toxin, commonly believed to produce its often deadly effects by poisoning the nerve-centers in the brain, is actually prevented from reaching the brain by a chemical mechanism termed the blood-brain barrier.

The injurious or fatal effect of the toxin is due instead to its action on the nerve fibers outside the brain which control the blood vessels. This action is best counteracted by hot baths, state Drs. Ulrich Friedemann and A. Elkeles in reporting their new theory of the diphtheria toxin's action to *The Lancet*.

Dr. Friedemann is the late Director of the Infectious Diseases Department, of the Rudolf Virchow Hospital, Berlin, and Dr. Elkeles is the late chief assistant of the Department. The extensive researches on which their new theory is based were continued in the laboratories of the Medical Research Council of Britain after the German doctors had to leave Berlin.

In their investigations as to whether or not toxins are kept from passing directly from the blood to the brain the physicians experimented with seven toxins. These included the poisons that are produced in diphtheria, botulism (the disease caused by an organism often present in canned food), tetanus or lockjaw, lamb dysentery and cobra venom. The botulism toxin, like that of diphtheria, they found, does not penetrate the blood-brain barrier. Tetanus toxin was already believed to reach the brain by way of the nerves, and not through the blood, and the doctors give reasons for thinking it is unable to pass through the blood-brain barrier.

The dysentery toxin and cobra venom, however, do pass the barrier. A very interesting point is that these two toxins act almost immediately while the others, which are found not to pass the barrier, have comparatively long periods of incubation.

The electrical condition of these toxins, when present in living blood, was also investigated. The discovery was made that the diphtheria, botulism and

tetanus toxins each carried a negative charge, while the cobra venom carried a positive charge and the dysentery toxin was electrically neutral. To Drs. Friedemann and Elkeles it thus appears that the blood-brain barrier is impervious to toxins that carry a negative charge and perhaps only to such toxins. They believe, however, that the majority of toxins fall into this group.

*Science News Letter, May 5, 1934*

GENERAL SCIENCE

## Researcher on Peking Man Honored by Academy

**H**ONORED after his death by the National Academy of Sciences, Dr. Davidson Black, Canadian-born scientist who achieved fame in distant China through his researches on the skull of ancient Peking Man, was given the posthumous award of the Elliot Medal for 1931, which carries with it a cash honorarium of \$200. Dr. Black was designated to receive the award before his death in Peiping on March 15; the medal and check were placed in the hands of Dr. Frank Dawson Adams, foreign associate of the Academy, on behalf of Dr. Black's widow.

The first award of the Charles Doolittle Walcott Medal and honorarium of \$1,350 was made to Dr. David White of the U. S. Geological Survey, in recognition of his work on the pre-Cambrian algae of the Grand Canyon of Arizona, which are among the very oldest of plant fossils.

Other honors bestowed by the Academy were: the Agassiz Medal, awarded to Dr. Bjorn Helland-Hansen of the Geophysical Institute, Bergen, Norway; the Public Welfare Medal, awarded to Dr. David Fairchild, formerly of the U. S. Department of Agriculture; and the Elliot Medal and honorarium of \$200 for 1930, awarded to Dr. George Ellett Coghill, Wistar Institute of Anatomy and Biology, Philadelphia.

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### HONORED

*The first award of the Charles Doolittle Walcott Medal pictured below and its attendant honorarium of \$1,350 were made by the National Academy of Sciences to Dr. David White of the U. S. Geological Survey in recognition of his research on the pre-Cambrian algae of the Grand Canyon of Arizona.*

