BIOCHEMISTRY

Find Make-up of Molecule

➤ SCIENTISTS at the University of California's famed Virus Laboratory have scored again, this time by determining the exact sequence in which amino acid units are chained together to form a protein molecule.

Their "guinea pig" was the tobacco mosaic virus, a living, rod-shaped particle about a hundred-thousandth of an inch long.

The virus consists of two major parts: a core of nucleic acid and an overcoat of protein. The protein overcoat is composed of about 2,200 identical protein molecules, each of which contains a single chain of 158 amino acid units.

Six months ago two members of the Berkeley team, Dr. Akira Tsugita and Dr. Heinz L. Fraenkel-Conrat, reported that a detectable change had occurred in the amino acid unit third from the bottom in the 158-link protein chain. The change was a result of a chemically caused mutation, or heredity alteration.

Pinpointing of this change provided a landmark in the long chain and allowed the researchers to determine what chemical unit followed the landmark and what chemical unit preceded it, until the entire sequence was known.

The discovery marks the first complete analysis of the amino acid sequence in a virus protein, the largest protein of any kind and the largest genetically governed molecule ever analyzed.

Sharing in the discovery, reported in the Proceedings of the National Academy of Sciences, Nov. 1960, were Nobelist Dr. Wendell M. Stanley, Drs. Janis D. Young and C. Arthur Knight, and Dr. Duane T. Gish, now of Upjohn Research Laboratory, Kalamazoo, Mich.

• Science News Letter, 78:342 November 26, 1960

BIOCHEMISTRY

Silicon-Based Life Possible

➤ LIFE FORMS containing silicon instead of carbon are possible—but not on earth, six scientists from the University of Pennsylvania reported to the National Academy of Sciences meeting in Philadelphia.

Their suggestions of a silicon-based life somewhere in the universe results from the fact that the chemical and physical properties of life-essential carbon and its compounds are more similar to the chemical and physical properties of silicon and its compounds than to those of any other elements.

Carbon is the chemical basis of earth life. All known living substances on earth contain both simple and complex carbon compounds.

The scientists have prepared, for the first time, silicon compounds that structurally are the exact counterparts of carbon compounds.

By comparing the silicon compounds with their carbon doubles, the scientists hope to be able to discover "how and why carbon and silicon compounds are similar to, or different from, each other," and thus discover more about the properties of the abundant silicon element and its compounds.

Silicon makes up one-quarter of the earth's crust; but little is known about its simple compounds, the scientists said. It is an essential constituent of all rocks and sand. Sand, for example, consists chiefly of silicon dioxide, a compound of silicon and oxygen.

The life-essential element of carbon, although it accounts for only one ten-thousandth of the earth's crust, has been studied extensively.

At the present time, knowledge of silicon compounds is 150 years behind the carbon studies, they said.

If a silicon-based life exists in the universe, it would have to originate on a planet having an entirely different composition from that of earth, one without oxygen, for instance, the scientists reported. The "life" too would be different and would compare with what we know to be life on earth only in growing and carrying out metabolic functions. Such living "things" could not exist, therefore, in the earth's atmosphere.

The silicon studies were made by M. Abedini, A. D. Craig, A. G. MacDiarmid, B. Sternbach, J. V. Urenovitch, and L. G. L. Ward of the University of Pennsylvania chemistry department.

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Do You Know

In both children and adults, the *weight* should be carried on the heels; many adult problems come from placing too much weight on the balls and toes of the feet.

Production of liquid carbon dioxide, an easily controlled industrial *refrigerant,* has nearly doubled, while output of the harder-to-handle dry ice has dropped off.

About 70,000 people are hospitalized for *burns* each year in the United States.

The daily national supply of *water* is 315 billion gallons; the demand amounts to a little more than 320 billion gallons a day.

George Washington's first national *budget* was written on a single sheet of paper; the current Eisenhower budget runs to 1,030 pages.

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