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Studies on Dissociation of Certain Paratyphoid Bacilli: Rôle of Variants in Precipitation of Calcium Sulphite.

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In the course of certain bacteriophage studies, cells, thought to be a type of variant, have been found which have the ability to precipitate calcium sulphite. The technique employed and the detailed results, together with a review of the literature, will appear in a forthcoming publication. Since these presumable variants gave rise to a daughter-colony-like structure, within which sulphite crystals were incorporated, they may be termed thiosomes. These sulphite-containing bodies have apparently not been reported previously nor has microchemical technique been resorted to in studies of this type.

On "Bacto-" agar plates, typical thiosomes are small (0.005-0.015 mm.), opaque bodies which are superimposed upon and at times in the medium surrounding ordinary colonies. They are black by transmitted light, white by reflected light. show extinction with crossed nicols and are iridescent with polarized light. Microchemical technique employed for the detection of cations and anions present revealed crystals typical of Ca^{++} and SO_3^{--} . Thiosomes were originally observed associated with *Salmonella schottmülleri* colonies obtained from sealed filtrates which had become opalescent or slightly cloudy; from certain daily broth transfers, when no filtrations intervened, of *Escherichia coli*, *Eberthella typhi*, *Salmonella paratyphi*, *Salmonella schottmülleri* and *Salmonella paratyphi*, Type C; and in association with an atypical strain of *E. coli* obtained from a case of cervicitis. Under proper experimental conditions, thiosomes were produced at will from the above named cultures. Atypical thiosomes, which more closely simulated daughter-colony-like structures and which were devoid of blackness, were not polarized and never occurred outside the colonies, were found upon a synthetic medium and also upon ordinary fresh veal infusion agar plates. Media used contained several concentrations of NaCl and CaCl_2 and mammalian Ringer's; media to which no salts were added were also used. A distinction must be made between fresh veal infusion and dehydrated "Bacto-" veal infusion; a sample of the latter contained 1.5 mg. of calcium per liter, while the former showed only a trace.

Evidence that the fundamental structure of a thiosome is colony-like appear as follows: (1) Atypical thiosomes resemble the opaque ones in size, in structure, in position on the colonies and in their irregular occurrence. With polarized light atypical thiosomes do not appear to be of a crystalline nature. (2) Lack of any definite pattern of sulphite crystals when numerous and, when few in number, their formation on the initial streak of the plate only, suggest the presence of scattered variant cells. (3) Intermittent occurrence of thiosomes during serial transfers in the same lots of media to which either no salts or NaCl had been added; also, variations in numbers of thiosomes in the control CaCl_2 media. (4) The association of thiosomes with S and R colony types. (5) The development on the part of some thiosomes of scalloped margins which have either lost their blackness or are less opaque. (6) By application of suitable reagents, CaSO_3 crystals may be dissolved and leave a colony-like structure devoid of any blackness.

Experiments, under way at the present time, are designed to attempt the cultivation of variant cells from these sulphite-containing bodies.

The possibility that certain variant bacterial cells may have the ability to precipitate calcium and hence be of some significance in the formation of certain concretions in the animal body is discussed.