

CATIONIC STABILIZATION OF ECHOVIRUS HAEMAGGLUTININS

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Thermal stabilization of enterovirus infectivity by 2 M $MgCl_2$ at 50° C for 1 hr is well known characteristic of enteroviruses (1). Both Mg^{++} and Ca^{++} cations stabilize haemagglutinins (HA) of echoviruses against their thermal inactivation (2). At 50–55° C, 2 M $MgCl_2$ stabilizes and increases reovirus infectivity without altering the HA titre (3) though the divalent ions at the sub-zero temperatures have a deleterious effect on both infectivity and HA. Influenza HA, however, is stabilized at 60° C by $MgSO_4$ and not $MgCl_2$ (4). We found three echovirus HA to be stable, with and without any additional cations, against 4 cycles of freezing and thawing at –20 and –60° C.

The prototype strains Wallace, Gregory, and Burke of echovirus 7, 11, and 19 were mixed with equal volumes of different solutions of pure $MgCl_2$, 6 H_2O (S. Merck) or distilled water, the final molarity being from 0.25 M to 4.0 M. All the HA titrations were done in the "V-plates" of the "Microtiter" apparatus using a 0.05% solution of bovine albumin in physiological saline as a diluent. The virus-cation mixtures were frozen at the two temperatures and thawed at 25° C. The mixtures with cations exceeding 2 M $MgCl_2$ did not freeze at either of the temperatures. The HA titre of the 3 viruses was unaltered by 4 cycles of freezing and thawing with and without different molarities of Mg^{++} . Mg^{++} cations were inefficient in thermal stabilization at 100 and 120° C though they did stabilize the HA at 55° C. The stabilizing effect at 55° C, manifested only with a molarity equal to or higher than 1 M $MgCl_2$, was continued even at

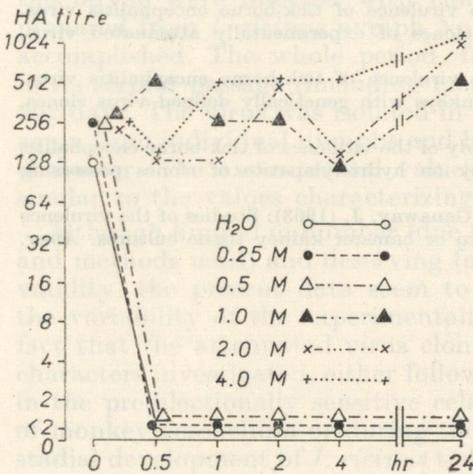


Fig. 1.

Cationic stabilization of echovirus HA at 55° C

24 hr (Fig. 1.) The failure of cations to destroy echovirus HA at the sub-zero temperatures appears to be another difference between the reo and echoviruses. The thermal stabilization even at 24 hr in this report is in contrast with similar effect lasting 7 hr at 55° C (2). Possibly the discrepancy is due to the titrations by the "Microtiter" and not by tubes. The different batches of $MgCl_2$ might as well have something to contribute in this connexion.

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