EFFECT OF ACETATE ON RESPIRATION AND MOTILITY OF BULL SPERMATOZOA.

Additions	Zo_2	Motility at 2 hours
Ejaculated spermatozoa:		
None	−25	++++
2,4-Dinitrophenol, 0·0001 *M*	−10	0
Acetate, 0·02 *M*	−23	++++
Acetate, plus 2,4-dinitrophenol	−28	+++
Pyruvate, 0·02 *M*	−26	++++
Pyruvate, plus 2,4-dinitrophenol	−30	+++
Epididymal spermatozoa:		
None	−7	++
Acetate	−13	++++
Pyruvate	−16	++++

Zo_2 = c.mm. oxygen/10^8 cells/hour. Respiration was measured in the Warburg apparatus at 37° as described previously[4]. Specimens were removed from the Warburg flasks after 2 hours to observe motility.

spermatozoa treated with 2,4-dinitrophenol is shown in the accompanying table. For comparative purposes data for pyruvate are included for each type of spermatozoa listed in the table. Stimulation of respiration and prolongation of motility, by acetate, were obtained with certain collections of ejaculated spermatozoa by storing at room temperature until the intracellular reserves had been partially depleted. The utilization of acetate as well as of the intracellular lipid reserve[5] is completely inhibited by malonate. Evidence to be presented elsewhere indicates that the mechanism of lipid metabolism in the sperm follows a pathway similar to the *iso*citric acid cycle. Breusch[6] has recently claimed that citric acid is an intermediate in fat metabolism. The presence of an active aconitase in the enzyme preparations from spermatozoa produces an equilibrium of *iso*citric, *cis*-aconitic and citric acids and prevents the identifying of the primary condensation product. Acetate may enter such a cycle but the mechanism is as yet undetermined. It has been shown that acetate increases the respiration and supports motility of epididymal, and of 2,4-dinitrophenol-treated ejaculated spermatozoa of the bull. This work was supported by a grant from the National Committee on Maternal Health.

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Effect of Factors Influencing Mutability

UNSTABLE genes are found to be very suitable for the study of many factors influencing mutability, because high-mutability stock yields significant results for a number of flies examined much lower than with standard *ClB* method. In this study the influence of chemicals on germinal mutations of unstable gene *mt-3a* (*Drosophila virilis*)[1] was investigated. Altogether 79,011 flies were examined and 3,617 mutants found.

Flies raised on food containing 0·1 per cent copper sulphate or on food made alkaline (*p*H 9–14) by means of sodium hydroxide, or flies from eggs and larvæ treated with sodium hydroxide or ammonium hydroxide, show a highly significant *decrease* of mutability; this was found both in mass and in individual cultures; the effect applies also to genes the mutability of which is influenced by other genes.

The chemicals themselves probably could not penetrate[2] into the nuclei of the germ cells, and therefore the decrease of mutability must have been the general effect of *disturbances* in the organism. A similar decrease of mutability in unstable genes, as a result of temperature disturbances, has been also reported[3,4].

Since in 'stable' genes similar chemical treatments result in an opposite effect (increase)[5], I reach the following conclusion: when a given physical or chemical disturbance is able to change the mutability, the *change* will be an *increase* in 'stable' (wild) genes where the natural selection favours the lowest feasible mutability-rate[6] (close to optimum stability); whereas, it will be a *decrease* in unstable' genes the mutability of which is close to the highest feasible (optimum unstability).

I wish to express my thanks to Dr. M. Demerec, Carnegie Institution, Cold Spring Harbor, for his valuable suggestions in the course of this work.

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Physico-Chemical Nature of Bacteriolysis

WITHIN recent years, much attention has been paid to the antibacterial action of naturally occurring and synthetic products. The principal problem to be solved is that of the nature of the primary effect on the bacterial cell of the bacteriolytic or bacteriostatic agent. By such studies the intimate nature of the bacterial cytolysis may be illuminated and a practical means of early diagnosis of the lytic process may be forthcoming.

Hewitt[1] claims that visible lysis induced by the action of lysozyme is preceded by an activation of the bacterial dehydrases, this being shown by the fall in the aerobic redox potential of bacterial suspensions shortly after the addition of lysozyme. In support of this, Dr. Subkova in this Institute has shown that the oxygen uptake of bacteria (*M. lysodeikticus*) rises prior to the onset of lysis induced by lysozyme. No drift in redox potential occurs, however, when bacteriophage is added to bacterial suspensions.

Theoretical considerations led me to the opinion that the effects observed by Hewitt might be explained on the basis of the changes in *p*H occurring when lysozyme preparations (*p*H 7·2) are added to bacterial suspensions (*p*H 6·3–6·4). It can actually be shown that mere alkalinization of a bacterial suspension produces a negative potential drift, while acidification produces an opposite effect. By combining both kinds of procedure one may repeatedly

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