

COMMENTS AND COMMUNICATIONS

Comments relating to articles which have recently appeared in the Journal of Cellular and Comparative Physiology and brief descriptions of important observations will be published promptly in this Section. Preliminary announcements of material which will be presented later in more extensive form are not desired. Communications should not in general exceed 700 words.

INFLUENCE OF pH ON THE GROWTH OF TETRAHYMENA IN SYNTHETIC MEDIUM

JOHN V. SLATER¹

Department of Zoology, University of Michigan, Ann Arbor

ONE FIGURE

The pH optimum for the growth of *Tetrahymena geleii* E. in peptone medium was established by Elliott in 1933 but the most effective pH for the growth of this ciliate in synthetic medium has not been demonstrated. It was shown by Slater ('51) that the medium usually used for the growth of strain E will not hold its initial pH especially when large amounts of glucose are present. The use of piperazine dihydrochloride and glycylglycine, as reported by Smith and Smith ('49) for the production of a non-toxic buffer system might be applicable for *Tetrahymena*.

¹Postdoctoral Fellow in the Biological Sciences, United States Atomic Energy Commission.

TABLE 1

Effect of initial pH on peak population production of Tetrahymena geleii E. in synthetic media

PLUS MINERALS				MINUS MINERALS			
Init. pH	Final pH	Peak O.D. ¹	Popul. Count	Init. pH	Final pH	Peak O.D.	Popul. Count
5.6	7.1	132	98,000 ± 9,200	5.6	6.6	119	76,000 ± 9,000
6.4	7.2	134	80,000 ± 7,800	6.6	7.1	134	82,000 ± 11,000
7.6	7.6	140	80,000 ± 5,400	7.6	7.1	125	69,000 ± 7,400
8.5	7.5	32	36,000 ± 1,040	8.5	7.9	21	9,900 ± 860

¹Optical density.

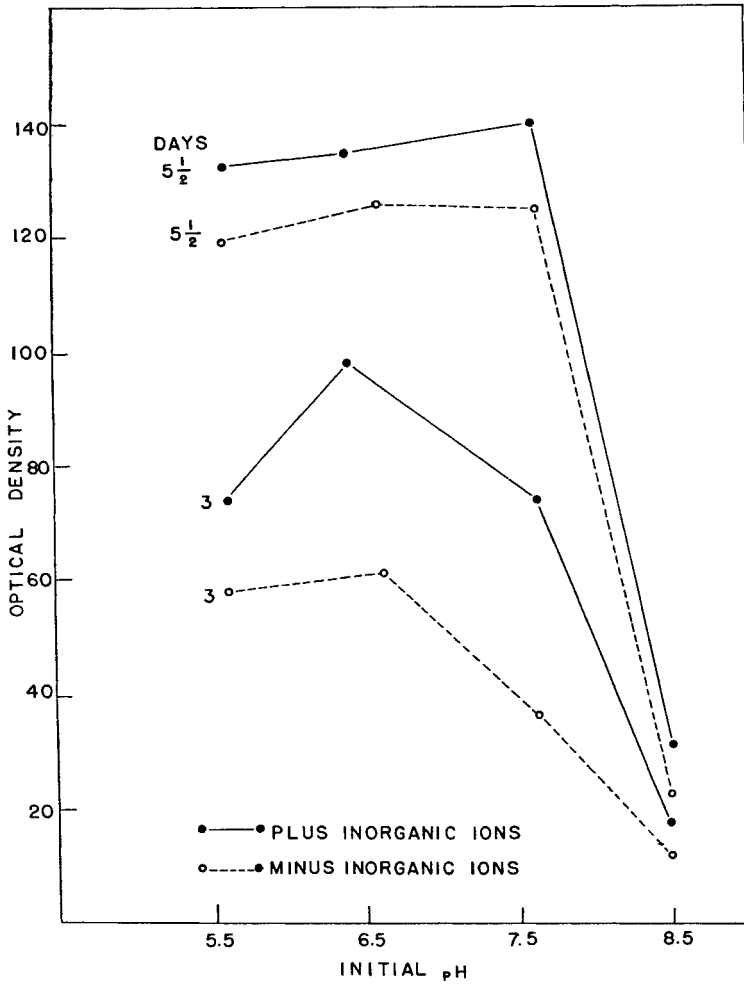


Figure 1

The composition of the medium and the procedures used were modified from Elliott ('49, '50) as previously reported by Slater ('52). Protogen² was used instead of α -lipoic acid, and magnesium sulfate to the extent of 10 mcg/ml was present in all instances (Slater, in press). The influence of the usual cation spectrum used was tested for any effect on the pH optimum for growth. None of the other cations were present in the media listed as "minus minerals" except for potassium as the phosphate and calcium as the pantothenate with the exception that the usual contaminations carried in with the analytic reagents were present.

In the presence of the cations, initial pH values from 5.6–7.6 did not effect the peak population production. At pH 6.5 the cations had no effect, but at pH 5.6 or 7.6 somewhat better growth was obtained when the salts were present. It is seen from table 1 that the ciliate was able to regulate its environmental hydrogen ion concentration to a final value of 7.1–7.6 regardless of the initial value when all of the cations were present. Acid production probably lowers the pH when cultures are started at high values, and nitrogenous excretory products raise the pH when cultures are incubated in media started at low pH values. After three days' incubation, cultures in media with the cations present were found to grow best at pH 6.4 (fig. 1), but after 5½ days about the same amount of growth was obtained in media started with an initial pH ranging from 5.5–7.5. The fastest growth rate, however, was obtained at pH 6.4.

The synthetic medium used for the growth of strain E does not yet produce tetrahymenal protoplasm as rapidly as does peptone. Work in this laboratory now in progress by Elliott and Wu (unpublished data) may result in a much improved synthetic environment for this animal.

LITERATURE CITED

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²The aid of E. L. R. Stokstad of the Lederle Laboratories Division, American Cyanamid Company, in supplying the protogen is gratefully acknowledged.

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CONCENTRATION OF HEMOGLOBIN IN THE BLOOD OF DEEP SEA FISHES

L. VAN DAM AND P. F. SCHOLANDER

Woods Hole Oceanographic Institution, Woods Hole, Massachusetts
(Contribution number 633 from the Woods Hole Oceanographic Institution)

It has long been known that deep sea fishes can secrete gas into their swimbladders against considerable pressures. Richard (1895) and Schloesing and Richard (1896) analyzed the swimbladder gas from deep sea eels, *Simenchelys parasiticus* and *Synaphobranchus pinnatus*, taken at 1674 and 1385 meters' depth respectively, and in a recent study fishes with swimbladders were found to be common down to a depth of at least 1000 meters, or at 100 atmospheres' pressure (Scholander and van Dam, '53). In agreement with the data of Schloesing and Richard we found also that at a pressure of about 100 atmospheres some 90% of the swimbladder gas consists of oxygen.

An important function of the gas secretion is to maintain the fish at a neutral buoyancy at any depth. In order to compensate for a given buoyancy decrease a molar amount of gas must be secreted which is proportional to the hydrostatic pressure at which the buoyancy adjustment must be accomplished. Thus, at 100 atmospheres' depth 100 times more gas must be secreted than at the surface in order to effect the same increase in swimbladder volume. This consideration led us to look for conditions which might possibly speed up or facilitate the gas secretion in deep sea fishes. Such a condition, if the oxygen secreted into the swimbladder