

basilic vein 24%. The average decrease of the carbon dioxide content of the blood obtained from the internal jugular vein was 9%.

Among the 9 subjects whose blood from the internal jugular vein was studied, 2 failed to show a rise in the oxygen content during the administration of histamine. As rise in the spinal fluid pressure occurs with regularity following histamine injection, one has to conclude that histamine in these individuals produced only a dilatation of the venules. Further evidence that histamine may induce dilatation of the veins directly is revealed through observations of the small veins of the conjunctiva which respond with a dilatation following continuous administration of histamine. Diffuse dilatation of the subpapillary venous plexuses of the skin also developed in certain persons during the administration of histamine, without simultaneous arteriolar dilatation.

One part of epinephrin chloride antagonized the effect of 10 parts of histamine phosphate on the minute vessels of the skin. Epinephrin chloride in the same ratio also abolished the changes induced by histamine in the cerebral vessels.

The evidence thus presented indicates that histamine produces marked vasomotor response in the minute vessels of the brain. Comparative quantitative observations demonstrate that the sensitivity of the cerebral vessels to the minimal effect of histamine is marked, and the sensitivity is at least as great as that of the facial vessels, which are the most sensitive of the cutaneous vessels. The sensitivity of the cerebral vessels to histamine and epinephrin suggests that these chemical substances through their local action may play a rôle in the physiologic and pathologic regulation of the cerebral circulation in man. Whether or not, in addition to the local *chemical vasomotor regulation*, direct central nervous vasomotor regulation of the cerebral vessels is active in man, is still an open problem.

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Thirteen Thousand Generations of Paramecium.

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As a matter of record it seems well to summarize the data and give the present status of the long-continued culture of *Paramecium aurelia* at Yale University.

Can unicellular animals reproduce indefinitely without recourse to fertilization? This was the question to which an answer was sought when this experiment was begun 22 years ago. On May 1st, 1907, a pedigree culture of *Paramecium aurelia* was started with a "wild" individual and has been maintained by the isolation of certain of its progeny practically every day, with the exception noted below. The number of divisions has been recorded at each isolation and has afforded a continuous series of data for the study of the reproductive activity of the culture. Throughout the experiment some of the animals discarded from the lines at the daily isolations have been fixed, stained, and mounted as permanent preparations for the study of the cytological changes during the life history. The culture medium for the first 8 months of the work consisted of infusions of hay and fresh grass, but since February, 1908, various materials collected from ponds, swamps, etc., have been employed. The infusions have invariably been thoroughly boiled to prevent the contamination of the pure culture with foreign strains of *Paramecium*. The possibility of conjugation occurring in the culture has been precluded by the almost daily isolation of the products of division. In short, the animals of the culture are all direct lineal descendants, without fertilization, of the single animal isolated in 1907.

In this manner the pedigree culture was carried for 8 years, during which 5071 generations were attained, and then (May 1, 1915), the experiment was considered formally closed with the statement that the organisms of the present generation are in as normal morphological and physiological condition as the original individual isolated to initiate the culture.

However, with this conclusion secure, I was reluctant to discard the race and have kept it under control, but without such exacting daily observation and recording of the daily division rate. Accordingly, it has been carried in this manner up to the present time (May, 1929). But from time to time 30-day tests have been made of the vitality of the race under the former rigid culture conditions, and in each case the same general average division rate has been revealed as during the first 8 years of its life. On the basis of such tests it is fair to make the exceedingly conservative estimate of 600 generations attained each year since May 1, 1915. This would give, in round numbers, 13,500 generations attained by the culture during the 22 years of its life to date since May 1, 1907. The vitality of the culture is further attested by the fact that it is continuously affording animals for various other experimental studies on *Paramecium* at Yale and elsewhere.¹

¹ Woodruff, L. L., *Am. Naturalist*, 1925, lix.