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Note on the secreted concentration of HCL in the gastric juice.

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It has been shown[1] that the secreted concentration of HCl (*i. e.*, the concentration of acid as it is secreted by the cell) may *not* vary between 0 and a concentration higher than the observed maximum concentration (about 0.6 per cent), but may vary between a certain value (at least 0.29 per cent) and the latter, if it does so at all.

The restriction of the limits of variation strongly supports Pavlov's contention, namely that HCl is secreted at a constant concentration. If this be true, it should be possible to test the validity of the assumption by observing the factor which converts the amount (weight) of HCl into volume (cc.) of acid secreted. If the factor behaves as a constant, the concentration must obviously be invariable.

Employing simultaneous equations of the following form,

$$hx + py + m = c$$

(x and y are factors for converting known HCl (h) and pepsin (p) values in terms of cc. (c), and m is the volume of mucus) taken from two successive observations over an equal period, in any one Pavlov- or Heidenhain-pouch dog, the following values of x were obtained:

0.15 (3), 0.16 (2), 0.17 (7), 0.18 (6), 0.19 (7),
0.20 (6), 0.21 (4), 0.22 (2), 0.23 (2).

The mean of $x = 0.19$ and the S. D. $= 0.02$. (The figures in brackets give the frequency of each observation in the series.)

It will be seen that x is relatively constant, probably as constant as can be expected from the methods available for the determination of pepsin and mucus.

The values for y, however, varied greatly (0.0001 to 0.14) and gave extremely low volumes for pepsin. If, therefore, pepsin be neglected and the Cl not accounted for by acid (*i. e.*, total Cl-HCl

[1] Lim, R. K. S., *Am. J. Physiol.*, 1924, lxix, 318.

Cl) be considered to be NaCl which has diffused through the gastric mucosa as an isotonic solution, and if this volume of non-acid fluid replaces py in the above formula, the solution of the simple equation gives the following values of x:

0.12 (1), 0.13 (1), 0.15 (2), 0.16 (2), 0.17 (4).
The mean of $x = 0.16$; the S. D. $= 0.02$.

According to the first value of x (0.19) the concentration of HCl as secreted by the cell would be 0.53 per cent, and according to the second value (0.16), it would be 0.63 per cent. These figures are suggestive when compared with the figure usually given as the maximum HCl concentration of the total gastric juice.

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The influence of lymphocytes on peptic digestion.

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It has been demonstrated[1] that polymorphonuclear leucocoytes neither activate nor contribute to the proteolytic power of pepsin when added in quantities (100,000 to 500,000 per cc.) commonly occurring in the gastric juice of dogs. It has now been found that lymphocytes behave in a similar manner, (see Tables I and II). Lymphocytes (lymphocytes 93 per cent, monocytes 4 per cent, polymorphs. 3 per cent) from the dog's thoracic duct lymph, were, after repeated washings in saline, suspended in distilled water and immediately added either to dog's gastric juice or to known dilutions of Merck's pepsin and the whole adjusted to constant volume and acidity. The ferment activity was estimated by Mett's method.

TABLE I.

Pepsin concentration	0	0.001	0.01	0.03	0.10	0.35	0.6
Control. No lymphocytes	0	0	0.6	1.3	2.4	3.6	4.2
150,000 lymphocytes	0	0	0.6	1.3	2.3	3.6	4.2

[1] Hou, H. C., *Am. J. Physiol.*, 1926 (in press).