according to Klein and Révész⁷ in another aliquot. A differential cell count was made on a sample of the suspension by staining with a 2 per cent 'Orcein' solution, placing a drop on a slide and examining the cells under the microscope. It was hereby possible to count differentially the number of *T*-cells, mitoses and non-*T*-cells.

The results from one typical experiment are given in Fig. 1. This shows first that at the onset of tumour growth the histidine decarboxylase activity is correlated with the frequency of tumour cell mitosis and, further, the lack of correlation between enzyme-level and total number of tumour cells. These results display striking resemblance to the situation in healing wound tissue where histidine decarboxylase is activated to peak-level on the first day after wounding².

These experiments strongly support the idea of histidine decarboxylase activation as part of certain types of rapid tissue growth⁸. This concept is now further strengthened by the clear correlation between mitosis frequency and enzyme activity in the initial stages of tumour growth.

Attempts at arresting tumour growth by enzyme inhibition are in progress.

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Orientation of Spermatozoa in Mucus of the Cervix Uteri

BOVINE cervical mucus has been shown to contain a mucoid which behaves as though its molecules were long, flexible and thread-like¹. The elastic properties and the Weissenberg effect shown by native mucus (at oestrus) are traceable to this molecular form². Native mucus may be drawn out into thick threads in which the mucus is anisotropic due to the uncoiling and alignment of the molecules along the lines of strain. It is probable that mucus secreted by the cervix uteri and expressed into the vagina is in this condition, the lines of strain running along the path the spermatozoa should follow.

It has been suggested that spermatozoa in cervical mucus would swim preferentially in the direction in which molecules were aligned. To test this possibility, threads of bovine oestrous mucus were drawn out with platinum hooks on to the central part of slides with parallel grooves of the type described by Harvey and Jackson³. A drop of bull semen was pipetted on to one end of each strip of mucus. The slides were then incubated for approximately 15 min. at room temperature in Petri dishes lined with filter paper damped with saline. For control purposes semen was also added to one end of a comparable streak of 0.9 per cent sodium chloride solution (saline) on a similar slide.

After incubation the mucus (or saline) was examined under a microscope. In fields very close to the semen drop, the sperm were so numerous that scoring would have been impossible. A number of fields were therefore chosen at a distance of about 2 or 3 cm. from the semen source. All the sperm in a given field were scored according to the direction in which they were travelling, as judged by eye in relation to the grooves in the slide (parallel to the direction in which the mucus had been stretched) and the cross-markings at right-angles to the grooves.

Table 1 shows the results of nine experiments in which two different samples of mucus and three samples of semen were used.

Table 1. ORIENTATION OF SPERMATOZOA IN A THREAD OF MUCUS. MEAN PERCENTAGES WITH STANDARD ERRORS (RANGE IN BRACKETS)

Direction of sperm movement	Mucus (9 exp.)	Saline (3 exp.)
Along the axis of orientation	70 ± 4 (59-91)	33 ± 1 (31-36)
At right-angles to the axis	20 ± 3 (4-35)	37 ± 1 (35-39)
Diagonally	8 ± 2 (0-18)	17 ± 1 (15-19)
Pivoting and circling	3 ± 1 (0-7)	12 ± 1 (10-14)
Proportion of those orientated along the axis going away from the semen source	65 ± 7%	65 ± 6%
Total No. of sperm counted	708	701

Orientation could not have been induced by flowing of the mucus along the slide because, in the first place, epithelial cells in the mucus were stationary, and, in the second place, there was little difference between the swimming-rates of sperm in the two directions, away from and towards the semen source.

Since the technique allows for unconscious selection of sperms for scoring, it was arranged for a further two experiments to be carried out by another observer who did not know the 'expected' result. Both sets of results from these experiments showed the same trend as those in Table 1, but to an even greater extent; in the first 84 per cent and in the second 95 per cent of the sperm were orientated along the strip of mucus. Of these spermatozoa 85 per cent and 97 per cent respectively were orientated away from the semen source. In the first none, and in the second only 1 per cent, of the sperm was circling.

Similar experiments were carried out with preparations of purified mucopolysaccharides dissolved in saline. These solutions did not have a prolonged relaxation time and the molecules, though similar to those in native mucus, were therefore randomly orientated. The results for two experiments with each of two such preparations were very similar to those obtained with pure saline. Of 1,092 sperm scored, 30 per cent were orientated along the streak, 34 per cent at right-angles.

It appears, therefore, that spermatozoa travelling in a thread of mucus are preferentially orientated in the direction in which the thread has been drawn out.

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