Table 1. ANALYSES OF POLYSACCHARIDES (PERCENTAGE)

Polysaccharide	Uronic acid analyses by Carbazole	Orcinol	CO_2	Hexose by anthrone*	Methylpentose	Acetyl
K-235	14	23		80	21	6·8
K-12*W*	16	25		83	21	6·8
M-6 of *K*-12	17	27		83	23	6·8
Mucoid *E. coli*	17	22	20	83	20	8·0

* Anthrone values are reported using galactose as standard; they are uncorrected, and therefore include the fucose. Because glucose, which is also present, gives a somewhat more intense colour than galactose, the total hexose content, if corrected for fucose and excess glucose colour, is approximately 55 per cent.

These data show that the polysaccharide isolated from the mucoid *E. coli* is identical to the capsular materials elaborated by *E. coli* strains *K*-12, *K*-235 and the *M*-6 mutant of *K*-12 which have been previously described[11–13] and seem to be identical to each other. This identity has also been suggested for several additional polysaccharides of other Enterobacteriaceae[14]. The structure of the *M*-6 mutant of *K*-12 has been partially determined[13]. The polysaccharide isolated from the organism obtained from this patient with cystic fibrosis is therefore not related to the alginate-like polymer produced by the Pseudomonads.

It is of considerable interest that all the polysaccharides described in this paper seem to contain *o*-acetyl groups as shown by infrared and analytical data (the analytical method used[10] involves distillation of acetic acid, and is therefore fairly specific). It is also of interest in this connexion that the infrared spectra published originally[12,15] for these polymers indicated the presence of *o*-acetyl, but this was not referred to by the authors.

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Cellular Uncoupling in Cancerous Thyroid Epithelium

EARLIER work at this laboratory has shown that cancerous liver cells, unlike normal ones, are not in ionic communication with each other[1,2]. This study has now been extended to another set of epithelial tissues.

Normal thyroids (rat, hamster) and transplanted thyroid cancers (Fischer rat tumour types 1–*C*2, 1–1*D*, 1–8, 1–4, 1–5*A*, 1–5*E*, 1–6, 1–7, 16–1, 16–4, 1–3 (ref. 3); and Syrian golden hamster tumour type Thy-2 of J. G. Fortner), were isolated in Krebs solution (23°–25° C) and intercellular communication was measured within 10–45 min. The technique of measurement, described in detail elsewhere[1], consisted essentially of passing a current (10^{-8} A), by means of a micro-electrode, between the inside and the outside of a cell, and recording the resulting changes in membrane potential with micro-electrodes positioned inside this cell (V_I), in an adjacent cell (V_{II}), and in more distant cells.

In normal thyroid tissue, such intracellular potential changes are detectable over several cell junctions from the electrode which is passing the current; the communication ratio, V_{II}/V_I, is about 0·25. The principal route of the current is clearly from the interior of one cell to that of another cell. Corresponding voltages are much smaller outside cells than inside them, and are of the same order of magnitude as in the bathing solution. Thus normal thyroid cells, within any given follicle, communicate well.

Cancer thyroid cells, on the other hand, do not communicate to any detectable degree. The various cancer types examined differ widely in growth rate and differentiation. For example, cells of rat tumour type 1–1*C*2 grow slowly and resemble normal thyroid cells relatively closely in follicular arrangement and the ability to make thyroglobulin and thyroxine. At the other extreme are the fast growing and widely deviant cells of types 16–1 and 1–3 which are not arranged in follicles and do not make thyroglobulin or thyroxine[3]. But, regardless of their rate of growth and extent of functional deviation, all the cancer types examined lack detectable cellular communication: the communication ratios are less than 0·002, the limit of resolution of the method; and the resistances between cell interior and exterior (cell input resistances) are higher than in normal thyroid cells (Table 1). Furthermore, the membrane potentials at zero current are significantly lower than in normal cells.

Table 1

Thyroid preparation	Communication ratio† (V_{II}/V_I*)	Cell input resistance (10^6 Ω*)	Resting potential‡ (mV*)
Normal			
Rat	0·28 ± 0·03	2·70 ± 0·09 (14; 6)	47·2 ± 0·6 (30; 13)
Hamster	0·25 ± 0·07	3·04 ± 0·19 (7; 4)	38·5 ± 0·7 (19; 4)
Cancerous			
Rat	< 0·002	20·54 ± 0·4 (114; 23)	26·4 ± 0·6 (114; 23)
Hamster	< 0·002	12·5 ± 0·94 (10; 4)	22·6 ± 0·5 (23; 4)

* Mean values with their standard errors. The differences in communication ratio, input resistance and resting potential between normal and cancerous cells are significant with probabilities better than 1 : 100 (hamster) and 1 : 1,000 (rat). In parentheses are the number of cells followed by the number of different preparations on which the measurements were taken (together for the columns headed communication ratio and cell input resistance).

† Limit of resolution of the method, 0·002.

‡ Potential between cell interior and bathing medium at zero current, after subtraction of electrode tip potential (in all cases < 5 mV).

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Cellular Uncoupling in Cancerous Stomach Epithelium

MEASUREMENTS of cellular communication, similar to those described by Jamakosmanović and Loewenstein in the preceding report, were performed on the surface epithelium of normal and cancerous human stomach. Pieces of stomach from surgical patients were isolated into Krebs solution, and electrical measurements were made on the surface epithelium away from the cut edges, 1·5 h after the blood supply had been interrupted.