Tegument, after the multiplications of the epidermal cells, was kept in vitro up to 12 days without signs of degeneration, and this was also found in the poorer medium (without embryo extract). Moreover, in explants of abdominal segments of 4 instar larvae, new cuticle (eso- and andocuticle) was found to be formed in vitro with lysis of the old endocuticle. The synthesis of the new cuticle occurs in the first 1–2 days of culture but thickening of the cuticle, as in vivo, was not observed after 8 days of culture (Figures 3 and 4).

The results of the described experiments emphasize the statements reported above about the difficulties of the in vitro culture of insect tissue, i.e. the need for improved media and the importance of hormonal control. For locust tissues, the medium tested in these experiments appears to be a relatively good one, mainly because of the addition of extract of locust embryos. However, multiplication of epidermal cells was not sustained, and it is difficult to discriminate whether some chemical compounds or hormones are lacking.

A result worthwile mentioning is the synthesis of new cuticle obtained in vitro by the culturing tegument of the 4th instar larvae taken after the multiplication of epidermal cells. At this stage of the moulting cycle, epidermal cells have either received hormonal 'information', or synthesis of new cuticle by the cells after multiplication is out of hormone control.

Riassunto. Negli espianti presi prima della moltiplicazione delle cellule epidermiche non si è avuto in vivo il picco di mitosi, ma solo ispessimento dell'endocuticola; nei frammenti espiantati al momento del picco delle mitosi si ha dopo alcuni giorni degenerazione delle cellule epidermiche; negli espianti di tegumento messi in coltura dopo la moltiplicazione delle cellule epidermiche si è ottenuta in vitro la sintesi della nuova cuticola (eso- ed endocuticola).

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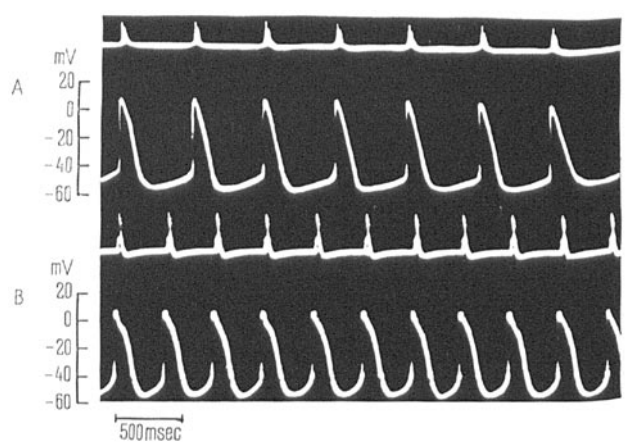
Effect of Histamine on Sinoatrial Node Cells of Rabbit Heart

It has been shown that histamine stimulates the isolated atria of rabbit[1] and guinea-pig[2]. Good pharmacological evidence assigns to histamine a direct cardiac effect not mediated through release of adrenergic substances[2–4]. Moreover, histamine initiates automatic activity in rabbit[5] and guinea-pig[6] isolated left atrium. Transmembrane potentials from non-pace-maker cells have been recorded during histamine treatment of rabbit atria[7].

The present study was undertaken to investigate the effects of histamine on cardiac automaticity, by directly studying its action on the pace-maker cells of rabbit sinoatrial node. Rabbits of either sex weighing approximately 1.5 kg were killed by cervical dislocation. Their hearts were removed immediately, and the right atria excised, opened and mounted horizontally in a thermostatically controlled perspex chamber. The preparation was bathed in a continuously-flowing pre-warmed Tyrode solution (30 °C), through which 95% O_2 and 5% CO_2 (pH 7.2) was bubbled.

Glass microelectrodes (0.5 μ diameter, 10–20 megohms) filled with 3.0 M KCl, and flexibly mounted, were directly connected to the input grid of a feed-back cathode follower. A unipolar electrode was also used in the experiments in order to record extracellularly from the atrial roof. Extracellular and intracellular recordings were displayed on a Tektronix 502 double beam oscilloscope. Photographs were taken with a Grass C4-K camera. Histamine (histamine dihydrochloride, Roche) was dissolved in the perfusion fluid and used for periods of 10 min at a concentration of 10^{-6} g/ml, expressed as the salt. The rabbit sinoatrial node area was identified by the recorded pace-maker potentials, which showed an appreciable diastolic depolarization and preceded muscular excitation by 10–30 msec. The photographic records were enlarged



Effect of histamine 10^{-6} g/ml on sinoatrial node cells of rabbit heart: (A) control; (B) during histamine treatment. Upper tracings: extracellular recordings (retouched). Lower tracings: intracellular recordings.

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Transmembrane potentials recorded from rabbit sinoatrial node before and after perfusion with histamine 10^{-6} g/ml[a]

	AR/min	AP (mV)	MDP (mV)	TP (mV)	MDP-TP (mV)	SPP (mV/sec)	DAP_{50} (sec)
Controls (137)	109 ± 1.3	56 ± 1.1	55 ± 0.8	47 ± 0.8	8 ± 0.3	24 ± 0.7	115 ± 2.1
Histamine (40)	154 ± 2.2	58 ± 1.7	52 ± 2.3	33 ± 1.7	20 ± 1.0	132 ± 6.4	112 ± 4.6

[a] Mean values ± S.E.; No. of observations in parentheses.

about 10 times and the following measurements were made of the projected image: AR = atrial rate; AP = amplitude of the action potential; MDP = maximum diastolic potential; TP = threshold potential; MDP-TP = amplitude of the pace-maker potential; SPP = slope of the pace-maker potential; DAP_{50} = duration of the action potential measured at 50% of its height.

Histamine 10^{-6} g/ml produces a positive chronotropic effect associated with a sharp increase in the spontaneous depolarization rate, as qualitatively shown in the Figure. The quantitative effects of histamine action have been evaluated by comparing the data obtained from several cells, before and after histamine treatment. Mean values of 40 pace-maker cell potentials recorded during histamine treatment in 13 experiments are shown in the Table, where they are compared with the values of 137 potentials recorded in the same experiments before administration of the drug. The AR, SPP and MDP-TP of the pace-maker potential are markedly enhanced, the TP is reduced, while the AP, DAP and MDP do not show appreciable variations. All these changes are statistically significant ($p < 0.001$).

Our findings show that histamine has an effect on heart sinoatrial node cells consisting of an increase in generator potential steepness. This action produces an increase in frequency discharge of both impaled pace-maker and atrial cells, as revealed by surface electrograms. Moreover, our results suggest a possible explanation for the positive chronotropic effect of histamine which is released during heart anaphylaxis in vitro[7-9].

Riassunto. È stato dimostrato che l'istamina ha un effetto sulle cellule del nodo seno-atriale del cuore di coniglio. Tale effetto consiste in un marcato aumento della velocità di depolarizzazione del potenziale «pace-maker», cui consegue un effetto cronotropo positivo.

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Bowel Serotonin Levels in the Fasted and Non-Fasted Sprague-Dawley Rat

The gastrointestinal tract of the rat contains approximately 60% of its total body serotonin[1]. The majority is present in the mucosa[2,3], where it arises from the argentaffin cells[4]. Levels of the amine have been reported frequently and in a variety of animals[5,6], however its functional significance is unknown. Unambiguous reports of the effects of feeding or fasting on bowel serotonin levels were not to be found in the literature, yet in evaluating the effects of drugs or in vitro studies the effects of antecedent feeding or fasting might be important. Certainly gastroduodenal histamine levels are significantly elevated after fasting in rats[7].

The results of our experiments with female Sprague-Dawley rats offer proof that a 16 h fast increases the bowel mucosal serotonin levels significantly in 8 of the 14 tissues studied. Details of our method of tissue preparation (and its efficacy) and spectrophotofluorometric analysis have been published elsewhere[2].

40 Charles River female Sprague-Dawley rats weighing between 220 and 290 g were fed Purina laboratory chow, with a tryptophan content of 0.22%. The rats were randomly allocated to 2 groups. To avoid any possible circadian influences – to date only reported for brain[8] – rats were always assayed between 08.30 and 10.00 h. The rats in group 1 were assayed after an overnight (16 h) fast, while rats in group 2 had ad libitum access to both food and water prior to assay. The tissues sampled were: esophagus, stomach fundus, stomach body and pyloric antrum, upper and lower duodenum, mid-jejunum, terminal ileum, appendix, cecum, ascending, transverse, and descending colon, and proximal rectum. Serotonin was

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