shown that ATP-ase activity in the retina is significantly accelerated by illumination[17]. Cations involved in ATPase activity, such as Ca^{++}, Mg^{++} and also inorganic phosphorus (P_i), are accumulated in relatively large amounts by isolated mitochondria. In vivo, mitochondria will rapidly accumulate i.p. injected ^{45}Ca and also ^{56}Mn and ^{89}Sr[18]. It was also suggested that Ca^{++} may play a role in the generation of the photoreceptor response to light[19]. It is hoped, therefore, that the planned elemental analyses of the *Poecilia* 'oil-droplet', under different light conditions, will provide a further insight into its functional significance.

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Acceleration of crypt cell proliferation by acoustic stimuli

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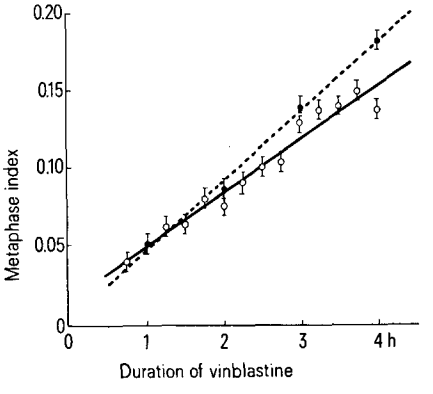
Summary. Cell proliferation rates in the bases of the crypts of Lieberkuhn in the jejunum of rat were measured using a stathmokinetic technique. In rats subjected to recurring loud noise cell proliferation was more rapid than in rats not subjected to the noise.

A wide variety of environmental stimuli, all of which could be considered to constitute forms of stress, have been shown to influence epithelial cell proliferation. For example, epidermal cell proliferation in mice is inhibited during both the acute stress of circulatory shock[1] and the chronic stress of overcrowding[2]. In the intestinal epithelium mild stress in the from of exercise promotes cell division[3] whereas more severe stress created by peritonitis[3] or electric shocks[4] inhibits cell division. In this communication the influence of auditory stress on jejeunal crypt cell proliferation is reported.

Materials and methods. Adult male Sprague-Dawley rats were used throughout the experiment. The mitotic rate in the bases of the crypts of Lieberkuhn in jejunum was measured using the stathmokinetic (that is, metaphase arrest) technique previously described[5]. All mitotic indices were corrected for sectioning artefacts[6]. In order to avoid errors attributable to the circadian rhythm in crypt cell proliferation[7], all estimates of mitotic rate commenced at 12.00 h. The mitotic rate was measured in 4 rats which were placed in a special cage and intermittently exposed to an acoustic stress of mixed frequency at 125 dB. This stress was applied for 1 min at the beginning of each 15-min-interval during the 4 h of the experiment. The mitotic rate was also measured in 14 rats not exposed to auditory stress.

Results and discussion. In rats not exposed to auditory stress (controls) the mitotic rate was 0.035 ± 0.002 (mean $\pm$ SE) mitoses per cell per h. In rats exposed to the auditory stress the mitotic rate was 0.045 ± 0.003 mitoses per cell per h. Analysis of variance shows that this value is significantly higher than that in control animals ($p < 0.05$). Graphs of mitotic index versus time after injection of vinblastine in control and stressed rats is illustrated in the figure.

Many hypothetical mechanisms could be proposed to explain the above result. One such proposal which is perhaps worthy of consideration is that the recurring loud noise simply leads to a general awakening of the rats from their usual daytime rest period. The animals used in the experiments are, of course, nocturnal and normally have their most rapid crypt cell proliferation between 0.00 and 4.00 h[7]. This nocturnal acceleration of crypt cell proliferation has been shown to be dependent upon the integrity of the sympathetic nervous system[8]. Thus, auditory stimuli may awaken the animal and promptly stimulate cell proliferation via a neural mechanism.



Accumulation of blocked metaphases as a function of duration of vinblastine treatment. ○——○, Controls; ●·····●, animals exposed to intermittent noise at 125 dB.

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