tion and at a faster rate than in the brown adipose tissue[4]. This could be accounted for by the higher concentration of lipase in the yellow adipose tissue. It may also be mentioned that the lipase activity in the pigeon adipose tissue is about six times greater than in the yellow adipose tissue in this bat[5].

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'On'- and 'Off'-Responses of the Olfactory Epithelium

SLOW-action potentials have been found in various sensory receptors in response to adequate stimuli. They were first found in the olfactory epithelium of a dog by Hosoya and Yoshida[1]. Recently, Ottoson[2] studied them extensively in the olfactory epithelium of a frog. He showed that the action potential is of a triangular shape, having a steeply rising limb, a round summit and a gradually falling limb in an exponential curve. When the duration of the olfactory stimulus is long, a plateau appears in the middle of the falling limb and continues as long as the stimulation. It is succeeded by an exponentially falling limb at the cessation of stimulation.

In the course of our experiments on the olfactory epithelium of a frog and a toad, action potentials were frequently found at the cessation of stimulation. Thus, two slow-action potentials appeared at the onset and the cessation of stimulation (Fig. 1, *b*, *c* and *d*). These phenomena are well known in the retina[3], in the optic nerve[4] and in the auditory nerve[5]. They are called 'on'- and 'off'- responses respectively. It is interesting that similar phenomena were found in the olfactory epithelium as well.

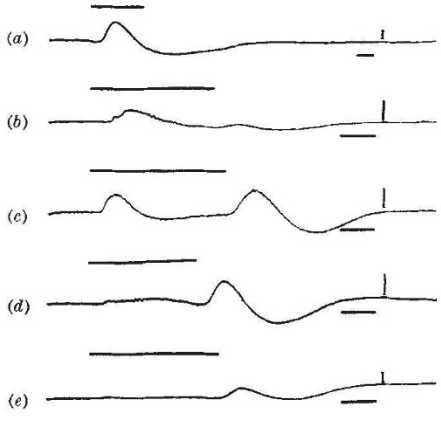

Fig. 1. On- and off-responses. (*a*), On-response. (*b*), (*c*) and (*d*), Various types of on–off-responses. The on-response is bigger than the off-response in (*b*) and vice versa in (*d*). (*e*), Off-response. The horizontal lines above the potentials on the left indicate the durations of olfactory stimulation. The vertical and horizontal bars on the right show 50 μV. and 1 sec. respectively

In order to study the stability of these response types, olfactory stimulation of the same odour and same intensity was repeated. It was found that the shapes and magnitudes of the potentials varied from time to time. An instance of such variability was shown in Fig. 1, *b*, *c* and *d*. The on-response is bigger than the off-response in Fig. 1, *b*, but vice versa in Fig. 1, *d*. These differing results were obtained in the same epithelium by successive stimulation. From these observations, it is supposed that the relation between the on- and off-responses is not simple and steady in the olfactory epithelium. In a few cases only the off-responses appeared (Fig. 1, *e*). Thus, in the olfactory epithelium of a frog and a toad, three types of responses, pure on-, pure off- and on–off-, were observed.

The olfactory epithelium is a single cell layer, constituted by the olfactory and sustentacular cells arranged in parallel. A synapse has not been found in the epithelium. Consequently, it is supposed that these responses are produced by the activity of the olfactory cells. Dogiel[6] and Jagadowski[7] described three types of receptor cell—one spindle shaped, one columnar and one conical. Though these findings have not been confirmed by other histologists, it is presumed that there may be two or three types of the olfactory cells, corresponding to the on- and off-, or on-, off-, and on–off-responses.

Detailed results and discussion will be published elsewhere.

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Synthesis of Diphosphopyridine Nucleotide from Nicotinamide by Slices of Liver

FOLLOWING the injection of nicotinamide, large increases in the diphosphopyridine nucleotide content of mouse tissues, particularly liver, have been reported by Kaplan and co-workers[1]. Although it is thought that diphosphopyridine nucleotide is synthesized from adenine mononucleotide, the increase in the former is accompanied by an increase in the total acid-soluble adenine content of the liver.

The present work shows that contrary to other reports[2] there is an increase in the content of diphosphopyridine nucleotide of rat and mouse liver incubated in oxygen *in vitro* in the presence of nicotinamide. Three- to four-fold increases in content of diphosphopyridine nucleotide were obtained both *in vitro* in the presence of 10^{-2} *M* nicotinamide and *in vivo* after the injection of 500 mgm./kgm. nicotinamide. The levels of triphosphopyridine nucleotide were unaffected.

In vitro the formation of diphosphopyridine nucleotide is at the expense of adenine mononucleotide (Table 1), as is to be expected if the former is formed from adenosine triphosphate and nicotinic acid or