It is interesting to compare the effects of heat and light on the peripheral glands in relation to pineal function. Regarding photic stimuli, it was demonstrated that pineal active hormones abolish most effects exerted by lhigt, and vice versa, pinealectomy erases the effects of darkness on the peripheral glands[11]. As to temperature stimuli, such a relationship appears less likely[8]. Both heat and light have a depressant effect on pineal metabolism, though they may act through different mechanisms.

It has been noted that in 12-day-old suckling rats which are poikilothermic, brief single exposures to temperatures of 7 and 34 °C failed to alter pineal HIOMT levels[12]. However, it has been shown for pineal tryptamines that the diurnal light rhythm is controlled differently in immature and adult rats[13].

Our results add further support to the postulation that the pineal gland may be integrated in the regulation system of adaptation to extreme temperature changes – although the mechanism by which heat alters pineal function is unknown.

Summary. Exposure of adult male rats to continuously elevated temperature of 32–34 °C caused a significant decrease of HIOMT activity involved in the specific metabolic process of production of melatonin, considered an active pineal hormone. The effect was already evident after 24 h exposure and increased further during the next 48 h. The results obtained substantiate previous data that the pineal gland may be involved in the system regulating adaptation to extreme temperature changes.

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PRO LABORATORIO

Design of a Temperature Controlled Microchamber for Electrophysiological Experiments in vitro

For electrophysiological experiments in vitro, it is essential to control as many environmental parameters as possible. The requirements for each kind of experiments vary[1,2], but most often cultures are transferred to a microchamber which has to be temperature-controlled, have openings for insertion of microelectrodes and be partly made out of transparent material to allow visualization of cells under a microscope. In addition, for our studies of the pharmacological properties of cultured nerve cells, we also required the chamber to be small, the system variably closed or open, and that it be perfused at a constant rate.

This paper describes the design of a microchamber which is easy to construct and to adapt.

Materials and methods[3]. The frame of the chamber (Figure 1) is made of anticorodal (Al–Mg–Si-alloy) to obtain adequate heat transfer to the surrounding bathing solution. It is insulated by anodical oxydation to enable the researcher to choose any given electrical potential as a reference point. The chamber has a volume of approximately 1.5 ml ($13 \times 25 \times 5$ mm). These dimensions were found suitable for our needs, since our explants cover an area of less than 6×12 mm. The bottom of the chamber consists of a glass coverslip glued (by means of Elastosil) to the metal frame, whereas the top is either open or partly closed by another coverslip laid on top of the metal frame and held there by surface tension. Insulated Philips thermocoax NcAc10 (12.5 Ω/m) served as heating wire and was inserted in a single winding in the metal frame around the chamber and reservoir. To ensure good thermal contact and mechanical stability, the space around the thermocoax wire was filled with heat conduction epoxy (E-solder 3025).

The actual temperature of the bathing fluid is constantly recorded by means of a thermistor inserted into one corner of the chamber. A commercially available bridge circuit (Alfos) is used as a control unit. The voltage produced when the bridge becomes unbalanced is amplified and applied to the heating wire. To prevent interference of a/c current with the electrophysiological

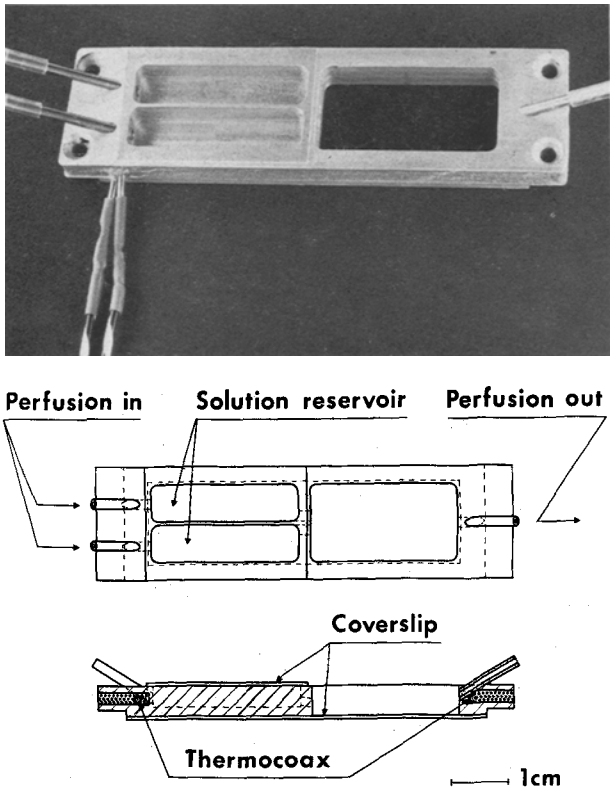

Fig. 1. Perfusion chamber with 2 reservoirs and heating wire inserted into the metal frame.

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signals, a 6 V car battery serves as power supply. The current is limited to 2A.

If the chamber is to be perfused, a reservoir (Figure 1) is needed to pre-warm the fluid before it enters the chamber. For our purposes we chose to have 2 reservoirs, thus permitting the injection of different solutions while recording bioelectrical activity.

The cells were grown on glass coverslips. For electrophysiological measurements, the coverslip bearing the culture was placed directly into the microchamber with the cells uppermost. The chamber is fixed to a rigid stage which fits between the objective and condenser of an inverted microscope.

Performance. The performance of the chamber was tested with a small thermocouple which was placed at different locations in the chamber. Relative temperature measurements could be performed with an accuracy of $\pm$ 0.1 °C. It was found that an alteration of $\pm$4 °C can be realized in about 1.5 min with the chamber being perfused at a rate of 60 ml/h. The temporal fluctuations in temperature were within $\pm$0.15 °C at any point in the chamber.

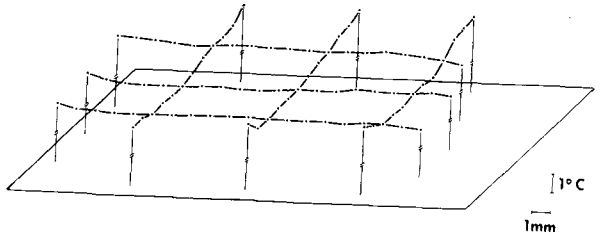

Fig. 2. Graph showing the temperature of the bathing fluid at different locations of the microchamber. The temperature measurements could not be extended all the way to the right side because of the location of the thermistor and the reference electrode.

As important as the temporal stability is the uniformity of the temperature distribution over a large area. In a schematic 3-dimensional graph, the temperature is plotted versus the dimensions of the chamber (Figure 2). The average temperature (66 data points, area = 10×18 mm) was 36 $\pm$ 0.29 °C. It is apparent that the temperature was higher in the areas adjacent to the walls. The slightly increased temperature at the rear of the chamber resulted from reduced heat loss caused by a perspex bar which holds the thermistor and the reference electrode.

The present paper demonstrates that the construction of a small temperature-controlled perfusion chamber without any hot spots or heat sinks is feasible with proper choice of materials. The chamber is easily adaptable to special needs. It proved to be reliable and mechanically stable in hundreds of experiments in which single unit recordings were successfully carried out for many hours, although the bathing solution was often changed.

Zusammenfassung. Konstruktion einer einfachen, temperaturstabilisierten ($\pm$ 0.3 °C) Durchflusskammer für elektrophysiologische Untersuchungen an Nervengewebekulturen.

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OECOLOGICA HUMANA

Man-made Chemicals and our Milieu Interieur: A Preliminary Report from the Special Commission on Internal Pollution

Editorial Note. The following contribution of the Special Commission on Internal Pollution (S.C.I.P.), London, seems to us to be of the greatest interest for the world-wide effort towards a health strategy, and we have therefore decided to publish it in 'Oecologica humana', inspite of its considerable length. M.

Almost every aspect of daily life in the industrialized countries has been touched on and transformed by the use of synthetic chemicals. The possible effect of these on our milieu interieur prompted us to write an article for these pages four years ago[1]. This publication evoked a large correspondence and stimulated the formation of a Committee to study the problems – the Special Commission on Internal Pollution. Its terms of reference were agreed as follows: To consider the present use of chemicals under four broad headings – medication, food additives and colourants, agricultural aids, and household goods; and to relate their respective use to the responsibility shared by the producers – that is, industry – the consumer, the government regulatory agencies, and the biomedical professions. Furthermore, it was resolved to examine the state of the chemical age in the last quarter of the 20th century, with special reference to the benefit: risk ratio in the different classes of compounds mentioned above, and see how this ratio can be improved. As a result of a recommendation on the political level it was also resolved to examine methods to achieve harmonization of drug safety protocols within the European Economic Community.

A report on some of our work in the field of medication, food intentional additives, and agricultural aids was given before a joint meeting of the WHO/EEC/USEPA at UNESCO headquarters in Paris last summer[2]. Our endeavours towards harmonization have been discussed a number of times with the appropriate authorities in Brussels, and a report issued[3]. Many of our proposals in this regard have become incorporated into the third EEC directive recently issued from Brussels. However, our concept of establishing a 'transnational regulatory drug agency' has not yet captured the imagination of the policy-makers at the headquarters of Europe in the rue de la Loi.

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