substance in the sera of uremic patients[2]. Perhaps the proposed substance was present in our A fractions. As these were rich in salts and of low pH (Figure 2), we diluted them considerably before adding them to the solutions bathing the toad skins and tubules; we hoped to minimize the 'salt effects' while retaining evidence of inhibition of sodium transport, as might occur were the inhibitor initially present in high concentration. The diluted A fraction did inhibit sodium transport in 2 of the 4 controls, and in all of the 6 uremics tested, but the degree of inhibition was commensurate with that expected simply on the basis of changing the osmolality, NH_4^+ concentration and decreased pH of the bathing solution, all of which factors are known strongly to inhibit active sodium transport[6–8].

It might be expected that mammalian, and particularly renal, tissue would be more sensitive to the presence of the postulated inhibitor than amphibian tissue. Far from this being the case, the extracts produced increased rather than decreased, fluid reabsorption across the proximal tubular wall. We believe this reflects the presence of induced tissue damage, with resultant increased passive permeability, rather than an increase in active sodium transport. We have thus been unable to demonstrate the presence of a factor in the sera of uremic patients capable of inhibiting sodium transport in either toad skin or isolated and perfused proximal tubules of the rabbit kidney.

Zusammenfassung. Die Wirkung verschiedener Serumfraktionen von Urämikern wurde mit Sephadex-Gelfiltration auf den Natriumtransport an der Krötenhaut am isolierten proximalen Tubulus von Kaninchen untersucht. Eine Hemmung des Natriumtransportes konnte nicht festgestellt werden.

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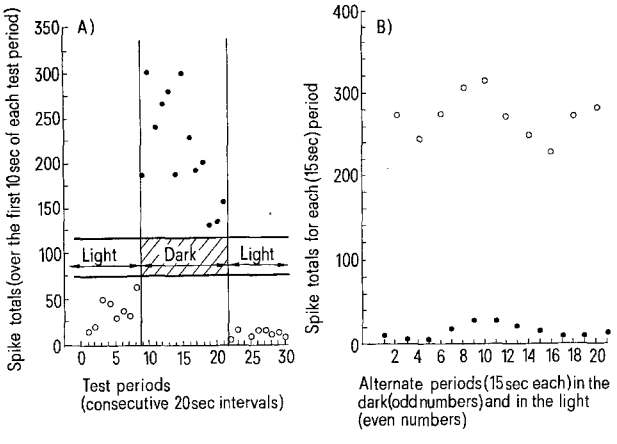
Is There a Single Cell Code for Background Light Levels?

When recording from single cells in the visual pathways, one occasionally encounters units, particularly in the midbrain, which give no response to localized light changes[1], yet their level of maintained discharge[2] does change over the longterm in a consistent way with the luminance of the environment. Could these units be part of a system which monitors and conveys luminance information to 'analyser' sites perhaps related to such activities as pupil control and adaptation state reference?

The following observations support the presence of such a coding system, and show in the midbrain how luminance changes in the visual surround can be demonstrated as a function of maintained activity at the single cell level.



Two midbrain cells with no spatially demonstrable receptive fields, but whose rates of maintained activity altered with changes of background luminance: A) a cell which increased its discharge rate in darkness; B) a cell which decreased its discharge rate in darkness. Dark (0.03 cd/m²) period responses are shown as filled circles; light (8 cd/m²) period responses are shown as open circles.

The examples cited are from amongst a cumulative sample of nearly 300 neurons within the rabbit mesencephalon now studied. The animals were prepared under light urethane anesthesia (3.3 to 6.0 ml/kg body weight of a 20% solution in saline, a dosage level found from earlier work to be no more detrimental to cell responsiveness than 'encéphale isolé' techniques). This was supplemented with 3.3 mg/kg body wt./h of gallamine triethiodide to prevent eye and body movements, the animal being artificially respired during that period.

The animals were supported stereotaxically, the stimulated eye in each case being refracted and fitted with a contact lens to protect the cornea from drying and to bring the retina into conjugacy with the 57 cm testing plane. Stainless steel microelectrodes (average resistance, 40 megohms) were introduced into the superior colliculus through an agar sealed skull aperture. Recording sites were later verified with the Prussian blue reaction.

Each cell was tested for the presence of a spatially defined receptive field. The particular cells of interest here, however, were those having no demonstrable receptive field to transient stimuli, but whose maintained background activity would change with time constants of seconds or even minutes to differential levels of background luminance.

The Figure shows the temporal histories of 2 such midbrain cells, giving no response to spatially limited stimuli, but marked response to changes of background luminance. In graph A), the maintained activity levels of a stratum opticum cell in the superior colliculus were integrated over alternate 10 sec periods, first in a bright environment (8 cd/m²), then in a very dim environment (0.03 cd/m²), and then in the bright environment once again. A considerable increase in dark period activity can

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be clearly seen, the average change in maintained discharge being greater than 6-fold.

In graph B), the reverse code is demonstrated with another cell (from the stratum griseum profundum layer of the superior colliculus) which sharply increased its maintained discharge in the bright environment above and decreased it in the dim one. This reversal, a 10-fold change in response, was repeated some 21 times with such consistency that even the longterm sinusoidal drift[3] inherent to this cell can be seen well represented and in phase at both luminance levels.

As reported earlier[4], certain specialty units with sharply localized receptive fields have been found to be wholly insensitive to changes of background luminance, even through contrast reversals. Yet, central cognizance of the surround luminance is clearly vital for purposes of pupillary control and adaptation state reference. Units, as described here, however, although poor in spatial definition, do exhibit the broad integrative properties required for such luminance assessments and thus appear uniquely suited to serve such needs.

Zusammenfassung. Nachweis, dass bestimmte Zellen im visuellen System, obwohl sie auf kurze transitorische Reize nicht reagieren, gleichmässig und langfristig auf Änderungen des Beleuchtungshintergrundes der Umgebung ansprechen.

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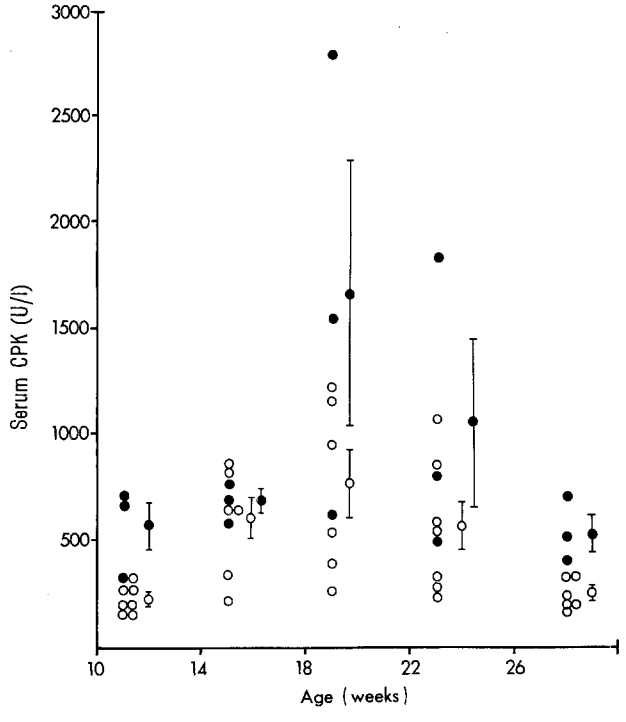
Age Dependent Variation of Serum Creatine Phosphokinase Levels in Pigs

Recently much has been written about the merit of elevated serum creatine phosphokinase (CPK) activity in diagnosing muscle disorders. The greatest increase in serum CPK activity occurs in Duchenne muscular dystrophy (DMD) while small increases may be observed in muscle atrophy of neurogenic origin[1]. The anaesthetic-induced malignant hyperthermia (MH) syndrome seen in man, a dominant-type inherited subclinical myopathy[2] can be detected by finding elevated serum CPK levels[3]. Occasionally, MH susceptible individuals may have normal serum CPK levels[4]. The clinically identical MH syndrome in pigs and the associated acute stress syndrome have also been correlated with elevated serum CPK levels by Woolf et al.[5]. The similarity of the syndrome in man and pigs makes the pig a valuable model for the MH syndrome and provides adequate tissue for biochemical investigation of the basic lesion which is apparently in the skeletal muscle[3]. Consequently, the possibility of using serum CPK levels to detect predisposition to the syndrome in pigs has been suggested[5,6] though the limitations were not fully recognized then. We have found that serum CPK activity in both stress susceptible and normal pigs vary enormously[7]. Although stress and exercise raise serum CPK levels in both man and pigs, we report here that unlike man[8] age is a major factor causing fluctuations in serum CPK activity in pigs.



Variation of serum CPK activity with age in 7 halothane-resistant and 3 halothane-sensitive German Landrace pigs. ○, halothane-resistant, $n = 7$; ●, halothane-sensitive, $n = 3$. Data are given as means ± S.E.M. for each group of pig. Halothane-sensitive pigs had elevated levels of CPK at 11 weeks ($t = 2.932$, d.f. 8, $p < 0.01$) and 28 weeks of age ($t = 3.000$, d.f. 7, $p < 0.01$).

Methods. We measured serum CPK levels in 10 pure-bred German Landrace pigs, a breed known to have a high incidence of the MH syndrome, between 11 and 28 weeks of age. There were equal numbers of males and females. The 10 pigs examined were taken from 2 litters selected randomly from a large herd. Blood samples were obtained every 4 weeks during the 11–28 week period. The pigs were housed in individual pens at 18–24 °C and were fed on a standard ration during the whole period. After 28 weeks of age all pigs were challenged with 3–4%

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