The $K_m$ of the nerve cord ChE is lower than that of heart ChE[13] showing its greater affinity towards the acetyl ester. In fact, it is shown earlier that the ChE of nervous tissue is more active than that of the innervated organs like heart, pedipalpal muscle and blood[3].
Absence of variation in $K_m$ values at different times of the day suggests that the enzyme affinity does not change with time. However, the fact that $V_{max}$ changes at different times shows that the enzyme is capable of hydrolyzing the substrate at different rates, depending upon the time of the day. From the $V_{max}$ values it might be stated that the catalytic activity of the enzyme to hydrolyze the substrate is maximum at 16.00 h and minimum at 4.00 h. It is also of interest to note that the general level of ChE ~~activity also~~ follows a similar trend[4]. Thus the higher level of activity at 16.00 h seems to be due to the high catalytic activity of the enzyme, and the lower level of activity at 4.00 h seems to be due to the lower catalytic activity of the same.
It is known that the excitatory neurohormone produced during daytime increases the enzyme activity, while the one produced during night-time decreases the same[9]. The ventral nerve cords isolated at different times of the day are possibly under the influence of these 2 neurohormones and the observed changes in the kinetic parameters might be due to the effect of these hormones. In vitro experiments were conducted to study the effect of neurohormones on $K_m$ and $V_{max}$ values. The CTNMs containing the acceleratory and inhibitory principles were collected at 12.00 noon and 12.00 midnight respectively and 1% (w/v) homogenates were prepared in cold scorpion ringer[10]; 0.1 ml of the extract was added to the incubation mixture, and the enzyme activity was determined. The $K_m$ and $V_{max}$ values determined in presence of the neurohormones are shown in the accompanying table. It is evident that the acceleratory principle present in 12.00 noon extract increased $V_{max}$ while the inhibitory principle contained in 12.00 night extract decreased the same. In both the cases, however, $K_m$ values did not change. These experiments clearly showed that the observed changes in the kinetic parameters of ChE are due to the influence of the neurohormones. Thus it might be stated that the neurohormones influence the enzyme activity by altering the maximal velocities rather than affecting the enzyme affinity towards the substrate.

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## Auditory and visual perception of simultaneous verbal and nonverbal stimuli[1]

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*Summary.* In an auditory experiment, digits and tonal sequences were presented simultaneously to both ears. In a visual experiment, words and nonsense figures had to be compared in both visual half-fields. The verbal stimuli were better reported from the right ear and right visual half-field. The nonverbal stimuli were reported equally well from both ears and visual half-fields. It appears that the processing of stimuli presented to both input channels depends on the type of the stimuli. These results point to a cerebral mechanism classifying incoming information to the brain and yielding an optimal processing of verbal and nonverbal stimuli by the cerebral hemispheres.

In experimental paradigms such as dichotic listening[2,3] and tachistoscopic vision[4], verbal stimuli (e.g. digits, words) are better reported from the right ear and right visual half-field, whereas nonverbal stimuli (e.g. tonal sequences, nonsense figures) tend to be better reported from the left ear and left visual half-field[5–7]. These findings are mostly interpreted in terms of the functional specialization of the left cerebral hemisphere for verbal information, and of the right hemisphere for nonverbal information, taking into account the connections of ears and visual half-fields with the opposite hemispheres[8,9]. On anatomical grounds, there are good reasons to assume an interaction between both sides of the brain, at either the cortical or subcortical level[10]. The function of this interaction could be the optimal distribution of information to different cerebral structures according to the functional specialization of the cerebral hemispheres[11]. Verbal information would thus be directed to the left, nonverbal information to the right hemisphere.
The present study aimed at a better definition of the interhemispheric interaction, by presenting verbal and nonverbal stimuli simultaneously to both ears and to both visual half-fields.

Table 1. Auditory experiment: average number of correct responses (N = 38)

| Stimuli | Ear right | left | t* | p |
|---|---|---|---|---|
| Part 1: sets of 3 digits | 9.6 | 8.3 | 3.15 | 0.002 |
| sequences of 5 tones (max. 12 each) | 7.3 | 7.2 | 0.11 | 0.9 |
| Part 2: sets of 3 digits (max. 24) | 19.1 | 16.5 | 2.34 | 0.002 |
| Part 3: sequences of tones (max. 24) | 11.2 | 13.2 | 2.58 | 0.01 |

* Student's-test for paired data.

1 This study was supported in part by grants 6.182–0.76 and 6.183–0.76 of the Swiss National Science Foundation to E. Perret.
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Table 2. Visual experiment: average number of correct comparisons (N = 32)

| Stimuli | Visual half-field right | left | t* | p |
|---|---|---|---|---|
| Words (max. 24) | 18.4 | 16.7 | 2.65 | 0.01 |
| Figures (max. 24) | 19.9 | 20.4 | 0.83 | 0.4 |

* Student's t-test for paired data.

*Auditory experiment.* Sets of 3 digits were given as verbal stimuli. The nonverbal stimuli consisted of 5 pure tones, differing sequentially in sound frequency, which made up a characteristic form. This form had to be recognized by visual multiple choice. The duration of the sets of digits and of tones was 1.5 sec. In part 1, digits were presented to the right or left ear, simultaneously with a tonal sequence to the other ear. Parts 2 and 3 were control tasks with only digits or only tonal sequences to both ears. Table 1 shows the average number of correct responses taken from 38 righthanded students.

Significantly more digits are reported from the right ear than from the left in parts 1 and 2. Tonal sequences together with digits are equally well reported from both ears in part 1, whereas tonal sequences to both ears yield a significant left ear superiority in part 3.

*Visual experiment.* The verbal stimuli were common four-letter words written one above the other, and projected to one visual half-field. The words were indentical, or they differed by one letter. Pairs of nonsense figures were simultaneously presented to the other visual half-field. The figures were identical, or they differed to an extent yielding about 75% of correct responses. Pairs of identical or different words were systematically combined with pairs of identical or different figures. Stimulus duration was 80 msec. The subjects had to decide if the figures, then the words were 'same' or 'different'. The average number of correct comparisons by 32 righthanded students is shown in table 2.

Words are significantly better compared in the right than in the left visual half-field, whereas the figures are compared equally well in both half-fields.

*Discussion.* In agreement with previous findings, verbal stimuli are better processed by the right sensory input channels in audition and in vision as well. It makes little difference whether the verbal stimuli are presented together with other verbal, or with nonverbal stimuli. Tonal sequences are recognized differently, depending on their accompanying stimuli: Together with another tonal sequence, they are better reported from the left ear; when presented with digits, however, the ear asymmetry disappears. Similarly, the left visual half-field superiority in the perception of figures is abolished when the companion stimuli are words[12].

We conclude that the information entering the 2 sensory channels of one sense modality is not handled completely separately by the 2 cerebral hemispheres, but that there is an interaction between the 2 sides of the brain[13]. The efficiency of the left channel seems to be influenced by the type of information in the opposite channel. This influence appears to be small for the right channel. This finding can be interpreted in terms of the importance of speech in human communication. Perception and processing of speech are crucial and, therefore, they must be guaranteed. Thus we suppose that there is a cerebral mechanism able to compare and classify inputs from the sensory channels, and yielding an optimal processing of verbal and nonverbal stimuli. Additional experiments are in progress to elucidate further how and where in the brain this comparison and classification take place.

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## In vivo lipolytic action of glucagon in brown adipose tissue of warm-acclimatized and cold-acclimatized rats

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*Summary.* Glucagon infusion caused a marked increase of brown fat venous FFA concentration, but the extent of increase was less in cold-acclimatized rats than in warm-acclimatized ones. Systemic venous FFA was not appreciably influenced by glucagon. Propanolol did not modify the changes induced by glucagon.

Ample evidence has been compiled to indicate a significant role of brown adipose tissue in cold acclimatization of various species of mammals and an enhanced activity of brown adipose tissue probably depends upon an elevated mobilization and utilization of free fatty acids (FFA) in this tissue by norepinephrine[2]. Recently, glucagon has been claimed to be a hormone of energy supply in case of exercise, fasting, etc.[3]. We have also contended that glucagon may serve an energy substrate-supplying hormone in cold acclimatization through its lipolytic action[4]. These results led us to investigate an in vivo lipolytic action of this hormone of the brown adipose tissue of cold-acclimatized as well as warm-acclimatized rats.

*Materials and methods.* All experiments were performed on male Wistar rats fed ad libitum under artificial light from 700 to 1900. The animals were divided into 2 groups; the one was maintained at ambient temperature of 25 °C (warm-acclimatized group) and the other at 5 °C for 2–3 weeks in the individual cages (cold-acclimatized group). The latter rats were transferred to 25 °C 18 h prior to the experiment. Glucagon (Novo Industri, A/S, Copenhagen, Denmark) was infused into the femoral vein at a rate of 2 µg/0.005 ml/min for 5 min under hexobarbital anesthesia (20 mg/100 g, intraperitoneally). Propranolol hydrochloride was injected at dosage of 500 µg/100 g intraperitoneally 10 min before the glucagon infusion. Systemic venous blood was obtained from the external