

INTERACTION BETWEEN SKIN TEMPERATURE AND VISUAL ANALYZERS AT DIFFERENT PHASES OF THE MENSTRUAL CYCLE

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Interaction between the skin temperature and visual analyzers is sharply diminished in women during the period of ovulation.

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Investigations in the writers' laboratory have demonstrated a connection between the visual and skin-temperature analyzers [1, 2, 8, 9]. A link between the function of the reproductive system and visual analyzer has been described by Lazarev [3]. Many investigations have been made of the effect of light on function of the gonads in animals [5, 11-13] and in man [4, 10]. Svetozarov and Shtraikh [7] give the following scheme for the action of light on reproductive function: light - eye - nervous system - pituitary - gonads. In contrast to the many investigations to study the effect of light on activity of the reproductive system and hormones connected with it, it was decided to investigate the effect of hormonal changes during the menstrual cycle in women on the character of interaction between the visual and skin-temperature analyzers, the existence of which has been demonstrated experimentally [1, 2, 8, 9].

EXPERIMENTAL METHOD AND RESULTS

The sensitivity of the eye to light was determined by means of an AM adaptometer. Interaction between the skin temperature and visual analyzers was studied by Kurilova's method [1, 2]. After preliminary dark adaptation for 30-40 min an infrared (Infrarouge) lamp located 1 m from the subject's back was switched on. Throughout the experiment the subject's eyes were insulated from the action of photic stimulation. The sensitivity of the eye to light was determined according to the adaptometer scale 1, 5, 10, and 15 min from the beginning of heating. The heating system was then switched off and the sensitivity to light again measured. The subjects were unaware of the time when the heating system was turned on and off.

Tests were carried out daily for three months (April, May, June) on four subjects aged 19-27 years. Their basal temperature was measured every day in the morning in bed. All subjects were healthy and had a normal menstrual cycle. Altogether 106 tests were carried out.

In all four subjects the level of sensitivity to light at the end of dark adaptation reached a definite level and then remained constant. During the action of the thermal stimulus this level was reduced by 0.17 ± 0.008 unit. At the end of exposure to heat the thresholds of perception of the photic stimulus were lowered and the curve returned to its initial level in the course of 5-10 min (Fig. 1A, C). Absence of or a sharp decrease (to 0.03 ± 0.004) in the reaction corresponded to the days of ovulation (Fig. 1B), which were checked by elevation of the basal temperature.

This "phenomenon of depression of the response to heating" must be considered to be independent of elevation of the basal temperature observed in the period of ovulation, because elevation of the temperature in the second phase of the menstrual cycle was not accompanied by depression of the response to heating.

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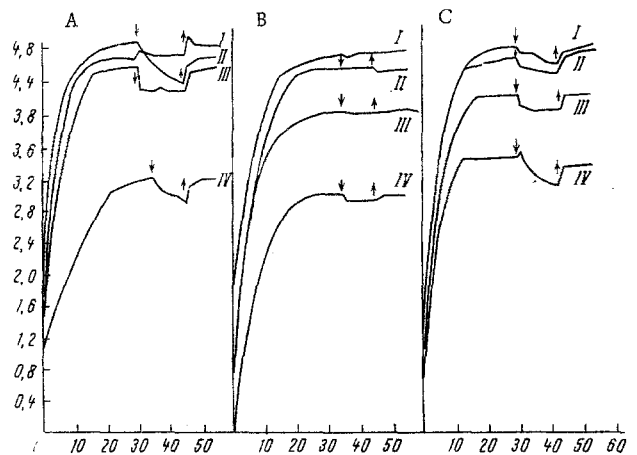


Fig. 1. Dark adaptation curves in the first and second phases of the menstrual cycle (A), during ovulation (B), and in the period of menstruation (C). Abscissa, time (in min); ordinate, sensitivity of the eye to light (in adaptometer scale units). Roman numerals denote subjects. Arrows pointing downward indicate heating system switched on, arrows pointing upward — off.

The results thus suggest that hormonal factors exert some influence on interaction between the visual and skin-temperature analyzers. This influence was most clearly expressed in the period of ovulation.

It may be postulated that hormonal changes taking place in the period of ovulation depress cortical activity. Because of this depression, interaction between the analyzers is reduced. This hypothesis is in agreement with data obtained by Pol'shin [6], who observed a marked decrease in cortical activity in the period of estrus when recording the EEG in rats, which are spontaneously ovulating animals.

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