The intensity of motor activity and the serum level of protein-bound iodine (PBI) were investigated in 62 puppies aged from 1 to 12 months. During the first 4 months of life a parallel increase in motor activity and PBI of the puppies was observed. The increase in motor activity of puppies between the ages of 7 and 9 months was not accompanied by any increase in PBI. In hypothyroidism caused by methimazole in puppies aged 1 and 3 months increased motor activity was observed, whereas in animals aged 7 months it was reduced. A higher intensity of motor activity than in the control animals also was observed 1 month after the operation in puppies thyroidectomized at the ages of 1 and 3.5 months. The activity of puppies thyroidectomized at the age of 1 month was sharply reduced 2-4 months after the operation. In dogs thyroidectomized at the ages of 7.5 and 11.5 months, reduced activity was observed as early as 1 month after the operation. The data showing opposite effects of thyroid hormones on the behavior of puppies at different ages point to a complex relationship between motor activity and thyroid function.

KEY WORDS: thyroid gland; motor activity; ontogeny.

In the postnatal development of man and animals periods of maturation of thyroid function can be distinguished [1, 3, 4, 7-9, 11, 12]. These periods may perhaps determine age differences in the formation of certain
behavioral and autonomic reactions. This applies in particular to the dependence of motor activity on the level of thyroid hormones in the body. However, because of the lack of any systematic research in this direction it is impossible to conclude whether there are any relationships of cause and effect between these parameters. The object of the present investigation was to study changes in motor activity in dogs, at different stages of postnatal development, under normal conditions and during depression of thyroid function.

EXPERIMENTAL METHOD

Experiments were carried out on 62 mongrel puppies born and reared in the Nursery of the Institute. The concentration of protein-bound iodine (PBI) in the blood serum of all the animals between the ages of 1 and 12 months was determined by the method in [5] and the spontaneous motor activity of the animals was recorded as in [10].

The floor of the experimental chamber was divided into 20 squares (80 × 80 cm). Motor responses — the number of sides of the squares crossed by the animal (horizontal activity — HA) and the number of times the animal stood up on its hind legs (vertical activity — VA) were recorded by the experimenter in another room, through a glass window. Each animal was studied monthly in two 20-min tests with an interval of 1 h between them in the course of one experimental day. Unlike in the program recommended by the authors cited, only two tests were used instead of 10, and each animal was studied several times. According to some data [10], the first two tests were the most important for the determination of motor activity.

Thyroidectomy was performed on 13 animals and in another 18 hypothyroidism was produced by prolonged administration of methimazole until the appearance of a peripheral effect (slowing of the pulse). The control group consisted of 31 puppies. Methimazole was given daily with milk in increasing doses — from 5 to 20 mg — to puppies under 4 months of age, whereas the older puppies (5–8.5 months) received doses of 10 to 30 mg. Thyroidectomy was performed at the ages of 1, 3, 5, 7.5, and 11.5 months. Changes in body weight, cardiac frequency, and motor activity of the thyroidectomized and control puppies were studied 1, 2, 3, and 4 months after the operation.

EXPERIMENTAL RESULTS AND DISCUSSION

During the first year of life two periods of increased HA of the puppies were observed (Fig. 1). It began to rise in the second month of life to reach a maximum by the age of 4 months. HA was low in animals aged 5 and 6 months, but increased again at the ages of 7 and 9 months. Only one peak of VA was observed, at the age of 2 months. This peak of activity later fell sharply — at 3 months, it is one-half of that at 2 months.