LETTER TO THE EDITOR

FACTORS MODIFYING SPONTANEOUS MOTOR ACTIVITY OF THE MOUSE

Sir,

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Spontaneous motor activity (S.M.A.) of rodents is one of the commonly and routinely measured parameter of experimental psychopharmacology. Apparently it seems to be very simple to measure S.M.A. While studying the action of some drugs on S.M.A. of the mouse it was observed that measurement of S.M.A. of the mouse was not as simple as it appeared to be. To get a reliable data on S.M.A. of the mouse the conditions of the experiment are to be meticulously controlled. The various factors which can modify the S.M.A. of the mouse and have been observed during the present study are being described in this letter.

Unless mentioned otherwise inbred adult male mice weighing 26 to 30 *g* obtained from the Department of Microbiology, Panjab University, Chandigarh were used during the present study and experiments were carried during winter months at room temperature of 21°C to 23°C. S.M.A. was measured by the method of Winter and Flatekar (5) as modified by Dews (3), using Technophotoactometer. S.M.A. of group of four mice at a time was measured as counts/10 minutes for nine 10-min. intervals, i.e. 90 min and data was plotted as time response curve (Fig. 1). The animals received intraperitoneal injection of 0.2 *ml* of normal saline before they were placed in the activity cage of photoactometer. Counting was started 10 min after placing the group of mice in the activity cage. Experiments were carried in the dark room and activity cage was covered with thick black drawing paper. All sort of noises were avoided. Even the noise produced by the leather sole shoes worn by one of the experimental worker increased the S.M.A.

During the course of present investigations it was observed that infant mice (12 to 15 *g* weight) were more active as compared to the adults. (Fig. 1A). It has been noticed that there was no change in the activity from 8.00 A.M. to 8.00 P.M. when experiments were carried during winter months. However, even during the early summer e.g. in the end of April, if the room temperature was not controlled by air conditioner or air cooler the activity decreased in the noon and increased again in the evening (experiments were carried on male adult mice supplied by the local dealer). As long as 200 years ago, Blagdan in 1774 (1) described the harmful effects of high ambient temperature on man as well as animals.

It was also observed during the winter months that there was sudden decrease in the activity after 10.00 P.M. (Fig. 1B). Another observation which was made during

the present study was that in water deprived mice (i.e. thirsty mice) activity increased very much and recently fed (both food and water) mice became lazy. (Fig. 1C). Enhancement of S.M.A. in food deprived rats (but given drinking water *ad lib*) has been reported by Borsy *et al.* (2). They termed the enhanced S.M.A. after food deprivation as orientational hypermotility. Borsy *et al.* (2) consider that hypermotility caused by food deprivation is due to 'Orientational reflex' which is the result of chain reactions at the psychic level the final manifestation of which is increase in S.M.A. It was observed during the present study that S.M.A. of female mice was much more than that of the male mice (experi-

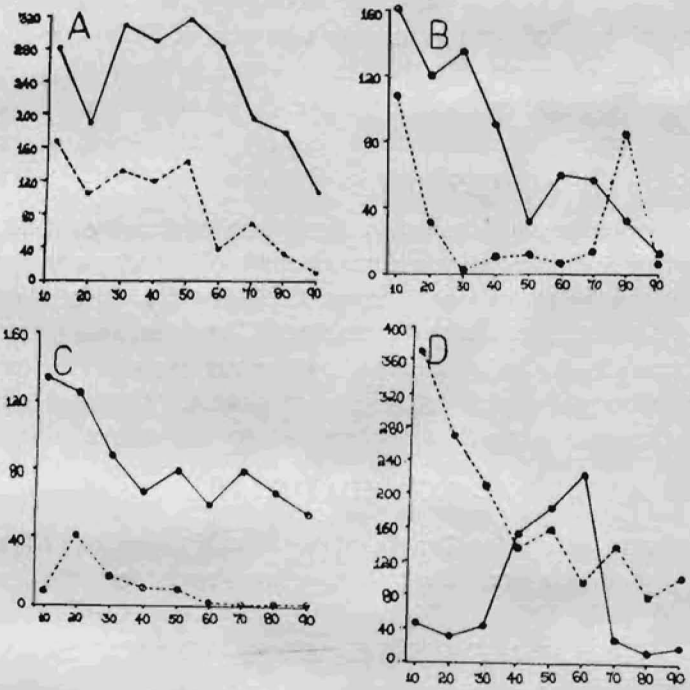

Fig. 1 : Abscissa represent time in minutes and ordinates represent counts per 10 mins.

A : Represents the effect of age on S.M.A. Upper time response curve (Continuous lines) represents S.M.A. of the infant mice and lower time response curve (dashed lines) represents S.M.A. of the adult mice. Clearly shows that voluntary activity of the infant mice is much more marked than that of the adult mice.

B : Upper time response curve (continuous lines) indicates S.M.A. of the adult mice and this experiment was completed at about 5.00 P.M. The lower time response curve (dashed lines), represents the S.M.A. of the adult mice and experiment was completed at about 11.00 P.M. Dwindled voluntary activity of the adult mice after 10.00 P.M. is evident.

C : Upper time response curve (continuous lines) represents S.M.A. of the thirsty adult mice. Lower time response curve (dashed lines) represents S.M.A. of the adult mice immediately after giving food and water *ad lib* to the adult mice. It is clear that the voluntary activity dwindled after feeding the mice with food and water.

D : Upper time response curve (dashed lines) represents the S.M.A. of the female adult mice and lower time response curve (continuous lines) represents the S.M.A. of their male batchmates. Voluntary hyperactivity of the female mice is conspicuous as compared to their male batchmates.

ments were carried in the mice supplied by the local dealer, Fig 1D). It is interesting to note that although activity of the female mice dwindled with time but even the minimal activity was much more than that of maximal activity of the male mice. The S.M.A. of female and male mice was compared under identical experimental conditions and groups of mice of both the sexes used for the experiment belonged to the same batch. Another chance observation worth mentioning is that by mistake one female mouse, presumably in oestrus, was placed in the activity cage along with three male mice. This group showed very high activity approaching that of amphetamine treated group. (After observing unusual high counts of this saline treated group of inbred adult mice for group 25 min the lid of the activity cage of photoactometer was removed for visual observation with torch light and it was observed that three mice were actively seeking one mouse. Subsequent to this observation, the genitalia of the mice were re-examined and mistake was realised). There is nothing unusual as far as high S.M.A. of this group is concerned but such a situation is of prime importance as this would vitiate the whole result.

It is concluded that while studying the action of drugs on S.M.A. of the mouse various factors like age, sex, weight, temperature, time of the day and external stimuli e.g. light and sound should be meticulously controlled. The S.M.A. of the female mouse in various stages of the cestrus cycle was not studied. The possibility cannot be ignored that S.M.A. in the mouse may be influenced by the oestrus cycle. Thus the male mice are preferable for studying the action of drugs on S.M.A. Using the mice of both the sexes in the same group is particularly liable to vitiate the results.

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