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EFFECTS OF GONIOTHALAMIN ON RATS' BEHAVIORS

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Goniothalamin is a biologically active styrylprone extracted from Goniothalamin tapis Miqo. It is a non-steroidal anti-implantation agent. In this experiment, the effects of goniothalamin on rats' behavior were investigated. The parameters studied were ingestional behavior (water and food intake) and "general @ overall" behavior (e.g., aggressive and ataxia). The subjects consisted four groups of 24 female albino rats each, aged 100-day old and weighed between 180-230 gms. The animals were kept under uniform laboratory conditions throughout the experimental period and food and water were given ad. lib. The behaviours of rats were studied from a control group and three groups which were treated with goniothalamin at the doses of 10mg/kg, 35mg/kg, and 139mg/kg body weight via oral route. The control group was given distilled water. Goniothalamin was administered every 21 days for 6 months to the first group of rats (4 subgroups - 6 rats each group). The second group was tested for water intake and the third group for food intake. Data were analyzed using one way ANOVA and Scheffe post hoc test. Observations of the rats' behaviors showed no significant changes in their overall behavior. Similarly, test on the ingestional behavior also showed no significant difference in water and food intake between experimental groups and the control group.

Goniothalamin ($C_{13}H_{12}O_2$). is a biologically active compound of styrylyprone group. It can be extracted from many Goniothalamus species including Goniothalamus tapis Miqo (Jewer, Davis, Dougen, & Manchanda, 1972), and locally known as *kenerak* or *mempisang*. Figure 1 shows the chemical structure of goniothalamin. According to

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the folklore medicine, this plant was believed to possess anti-fertility action in women; and had long been utilized as contraceptives among the Malays in the Northern Peninsular of Malaysia. Goniothalamin is also an effective anti-implantation agent and has been shown to have anti-fertility effect in mice (Azimahtol & Johnson, 1991) by suppressing the progesteron (Azimahtol, Johnson, & Laily, 1992). Behavioural screening on animals had carried out to confirm the allegations by many women that drinking the water extract of this plant made them thirsty and consumed a lot of water. Whereas observational screening on the rats' overall behaviours was to evaluate the side effects of this extract in animals.

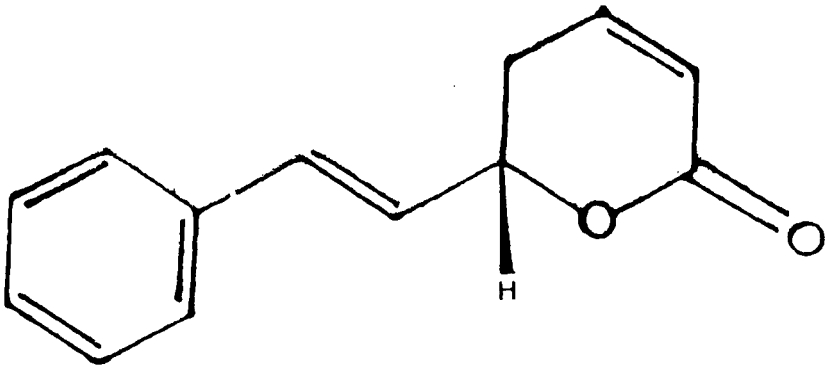

Figure 1

Chemical Structure of Goniothalamin ($C_{13}H_{12}O_2$).

The general aim of these studies was to specify further the effects of goniothalamin on certain behavior of rats. The parameters studied were ingestional behaviours (water and food intake) and general or "overall" behavior (such as changes in locomotor activity, ataxia, and sedation). Thus, these experiments were performed to establish the behavioural side effects produced by the compound as goniothalamin is currently under attention as a potential anti-fertility agent with lesser adverse effects as compared to modern contraceptives.

METHOD

Sample

The subjects were 96 adult female virgin albino rats, aged 100-days and weighing between 180-230gms. They were divided into four groups of 24 rats each. They were housed in individual cages with access to food pellets and water. The rats were kept under uniform laboratory conditions through out the experimental period. They were maintained under a 12-hours light: 12-hours dark cycle (lights on at 7 p.m and off at 7 a.m), and the room temperature was kept constant at 20-21 degree centigrade. Before testing, the rats were thoroughly accustomed to handling.

Drug

Goniothalamin was supplied by the Department of Biochemistry, Faculty of Life Sciences, Malaysian National University. This compound was dispersed in distilled water to which Demethyl Sulfoxide (DMSO) and 100% ethanol had been added. All injections were administered orally through a rubber tube in a volume of 1ml/kg body weight.

Procedure

The rats' behaviours were studied from a control group and three experimental groups which were treated with goniothalamin at the doses of 10 mg/kg, 35mg/kg, and 139mg/kg body weight. The control group was given distilled water. Care was taken to familiarize the rats completely with experimental procedures before running the experiments. The feeding and drinking tests were conducted during the dark cycle (started at 7 a.m) since rats are nocturnal animals. During the experiments two red lamps with the power of 5 Watt (very dim) were used.

Experiment I

For the overall behavior test, goniothalamin was administered every 21 days for 6 months. After every treatment the rats were placed individually in transparent cages which were identical to the home cages. Their behaviours were recorded by three video recorders over a period of 4 hours. The overall behaviour exhibited by the rats was recorded using a check list, which included, changes in locomotor activity, ataxia, sedation (Oliveira, Monteiro, Macaubas, Barbosa & Carlini, 1991).

Experiment II

For the drinking test, the rats were first adapted to a 22 hours water-deprivation schedule, and obtained water from a 50ml calibrated cylinder. Thirty days familiarization was sufficient for the rats to reach asymptotic intake. The volume of water consumed during the 2 hours test period was determined by reading the level in the calibrated cylinder to the nearest 0.5 ml.

Experiment III

For the feeding test, the rats were first adapted to a food-deprivation schedule for 30 days in which they were given only 12gms of food pellets every day. Consumption of the pellets was measured by successive weighings, and intake was calculated after 4 hours of test. Weighings were made on a sensitive electronic top loading balance and were recorded to an accuracy of 0.1gm.

For the comparison between three experimental groups, *Mean* intake were calculated for each group, and then the data were analyzed using a one-way ANOVA and Scheffe *post hoc* test.

RESULTS

Observations of the rats' behaviours showed no significant difference in the overall behavior exhibited between each group. No sign of changes in behavior, ataxia or sedation was shown. After the usual climbing and grooming activities (because of novelty since they were placed in the different cages) for about 15-20 minutes, the rats then stopped moving and started to eat or drink. Most of the time they were asleep or lying down. Goniothalamin also had no effect on the level of food consumption [$F(3, 20)= 1.296$, $p> 0.05$]. Similarly in drinking test, goniothalamin tested over a range of doses from 10mg/kg to 139 mg/kg had no effect on the volume of water intake [$F(3,20)= 0.754$, $p>0.05$]. Hence, this compound showed no significant effects in the behavioural paradigms tested.

DISCUSSION

Our results demonstrated that goniothalamin did not affect the overall behaviours of rats. We also failed to find any increase in water

intake in the rats although many women taking the water extract of this plant claimed that they felt hot and drank a lot of water. This compound also lack the hyperphagic effect even in the case of food deprived rats. No behavioural side effects identified, which make goniothalamin a potential anti-fertility agent; because researchers from all around the world are keen to find a suitable contraceptive with the utmost effectiveness but with less harmful side effects (Diczfalusy, 1991). Taken together, the results indicate that this extract may be safe for human use and deserve further investigation.

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