Method of Assessment of the Dynamics of Salivary Function in Rats during the Experiment

A.B. Denisov

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The dynamics of salivary function was studied on 80 laboratory rats. It was found that construction of a graph showing the dynamics of stimulated salivation in small laboratory animals could be successfully used in various studies.

Key Words: *saliva; salivary function; rats; salivary gland*

Study of salivation in the experiment has a long history. In the second half of the nineteenth century, the salivary glands as an object for study played an important role in discovery of many phenomena in physiology. Even then I. P. Pavlov demonstrated that conditioned salivary reflex in cat could be developed only on the basis of the motor technique. Indeed, in the experiment saliva can be obtained in animals only after stimulation.

Salivation processes in small animals (rat, mouse) are now studied in different ways: the total (net) secretion from the mouth, specific secretion of certain glands (cannulation method), and secretion of isolated and perfused glands are measured.

Our study presents data assessing salivation dynamics in rats in the experiment.

MATERIALS AND METHODS

The experiments were carried out on 80 non-linear rats of both sexes weighting 120-150 g. Salivation was stimulated with pilocarpine (5 mg/kg intraperitoneally).

Saliva collection was performed in the stand of own construction [2]. The flowing saliva was collected and its volume measured with a 1-ml syringe every 3 min. Since the rats had different body weight and saliva was secreted within various periods, the result (in ml) for the time *x* in rat *y* was converted in ml/hr/kg for unification of the results. Then, salivation intensity as a function of time (dynamics) was constructed.

Data visualization was carried out using Excel and Statistica 6.0 software.

RESULTS

Measurement of salivation on 40 alert and narcotized rats (ketamine anesthesia, 75 mg/kg intraperitoneally) showed that anesthesia does not affect the salivation pattern. The shape of net salivation curve (Fig. 1) reflects phases of the secretory cycle (synthesis, accumulation, and release of the secret) by glandular cells of rat salivary glands. After adequate anesthesia and pilocarpine stimulation, the first and second secretory cycles were distinguished on the plot (T_1 and T_2; Fig. 1, *b*). High variability of salivation rate is worthy of note: the coefficient of variation was 43-48%.

Salivation started 4-14 min after injection of the stimulant, which agrees with previous findings [4].

Collection of the saliva and construction of salivation curve in various pathologies (40 rats) provided a picture of salivary gland adaptation to the studied factors [1,3]. For example, on day 3 of experimental infectious prostatitis, a sharp, but short-term increase of salivation was observed (Fig. 2, *a*). A similar, but weaker enhancement was noted on day 34 of allergic prostatitis (Fig. 2, *b*). One day after experimental reduction of incisal bite, salivation increased, but the curve had two peaks (Fig. 2, *c*).

Department of Pathophysiology, Dentistry Faculty, Moscow State Stomatological University, Russia. ***Address for correspondence:*** denissoff@mail.ru. A. B. Denisov

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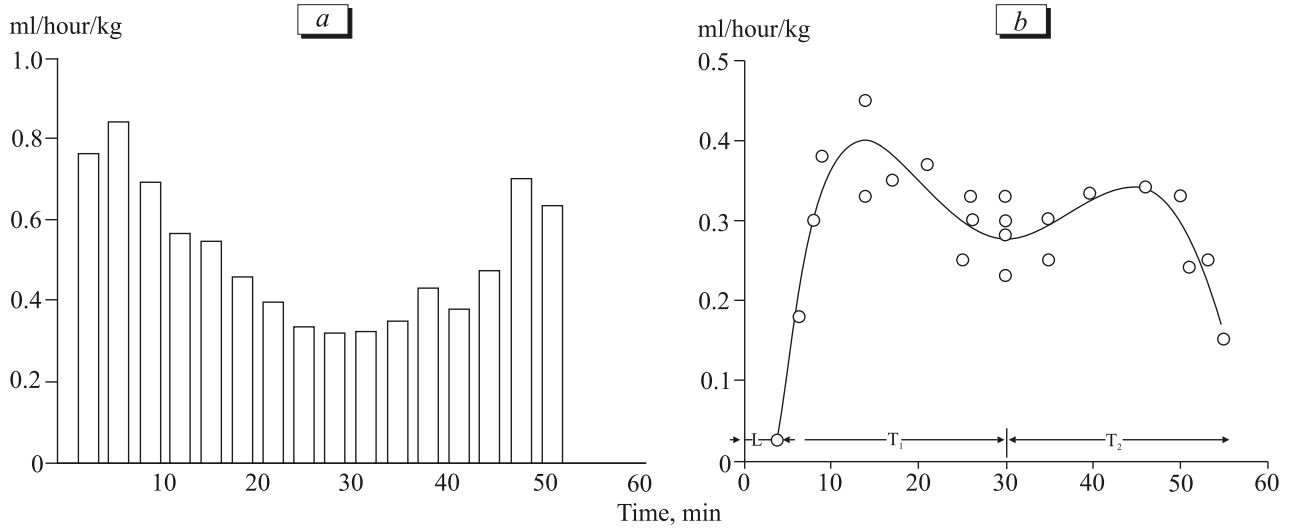

Fig. 1. Dynamics of stimulated salivation in rats (n=17). *a*, saliva collection without anesthesia; *b*, saliva collection with the use of ketamine anesthesia. *L*, latent period, T_1, the first and T_2, second secretory cycles.

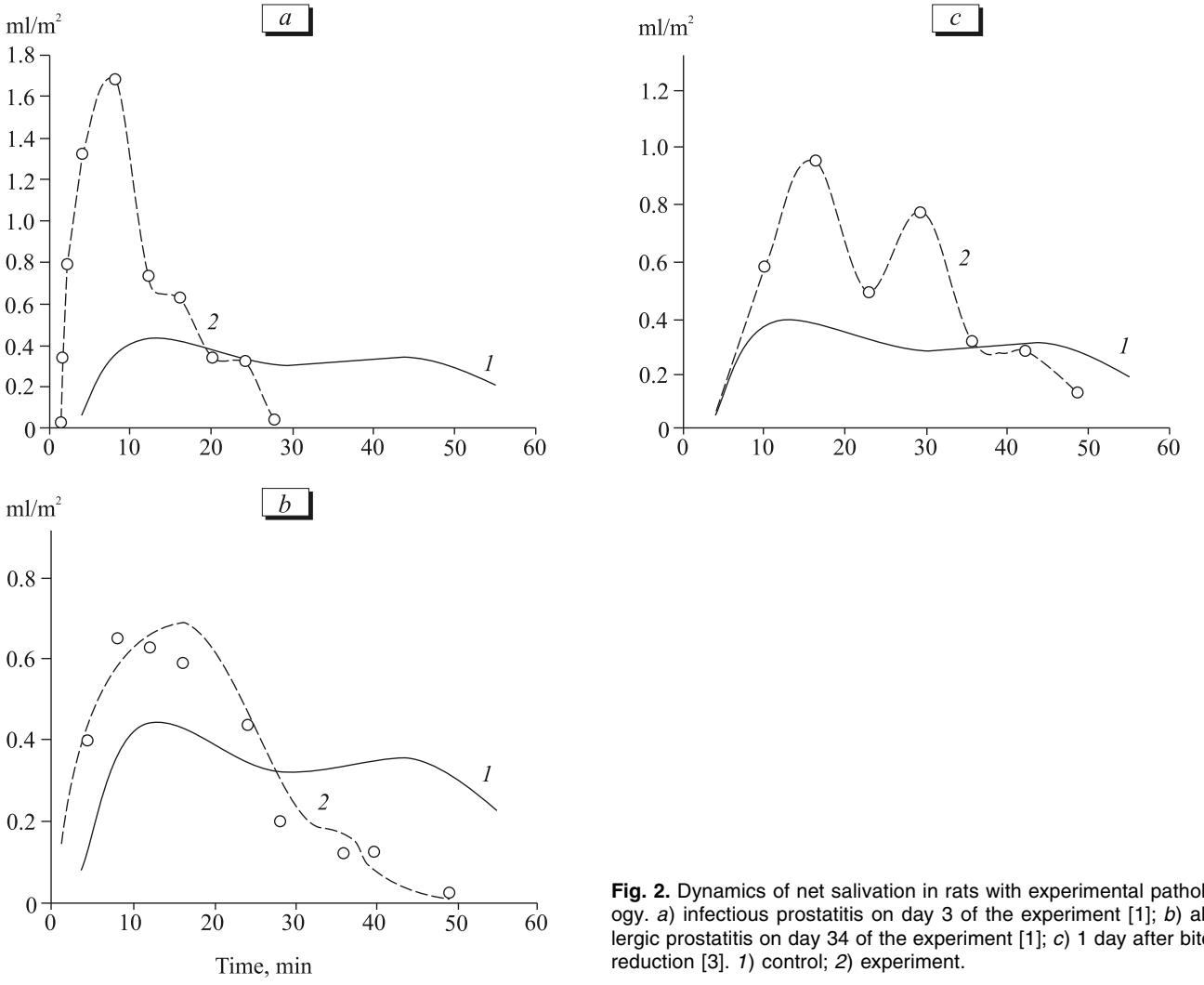

Fig. 2. Dynamics of net salivation in rats with experimental pathology. *a*) infectious prostatitis on day 3 of the experiment [1]; *b*) allergic prostatitis on day 34 of the experiment [1]; *c*) 1 day after bite reduction [3]. *1*) control; *2*) experiment.

Thus, the study of the dynamics of stimulated salivation in small laboratory animals can be successfully used in various studies.

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