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LONG TERM INVESTIGATION OF MICTURITIONAL PATTERNS AND TISSUE CONTENT OF NERVE GROWTH FACTOR IN THE URINARY BLADDER OF STREPTOZOTOCIN-INDUCED DIABETIC RATS

Hypothesis / aims of study

Nerve growth factor (NGF) is a biomolecule, which is produced within the innervated target organs. NGFs move to neural cells by axonal transport and participate in differentiation, induction and maintenance of neurons.

Previously we reported about tissue content of NGF in the urinary bladder ([bladder NGF]) in streptozocin (STZ) induced diabetic rats. In the early phase from induction, [bladder NGF] rose above the physiological range.

In this study, we present results in long-term investigation for micturitional patterns and [bladder NGF] in STZ induced diabetic rats.

Study design, materials and methods

(1) **Materials**

27 subjects of 7 to 11 week old female Wister rats were used. We divided them into three groups. In STZ group, rats were made diabetic by a single injection of STZ diluted with 0.1 M citrate buffer (60mg/kg, i.p.) after fasting for 24 hours. All diabetic animals had blood glucose values > 250 mg/dl. For the references of evaluation, a diuretic control group fed with 5% sucrose (SUC) (SUC group) and normal control animals (Control group) were also maintained.

(2) **Evaluated parameters**

The time course of micturitional pattern and [bladder NGF] were recorded and measured on the day 7, 14, 28, 56, 84 after the induction.

(2) **Statistical analysis**

Obtained parameters were evaluated by the Mann-Whitney U test for the difference between the STZ, SUC and Control group at significance levels of $p < 0.05$.

Results

1. The tidal voided volume in STZ and SUC groups increased from induction. Both groups maintained the increased volume at 3 months after the onset.
2. On day 7, [bladder NGF] significantly increased both in the SUC and STZ groups, showing 4 folds and 2 folds higher values than Control group. However, on day 84, [bladder NGF] in STZ group declined to the half of the value in Control group, where as [bladder NGF] in SUC group maintained above the value in Control group (Table).

Concluding message

In the early phase of this experiment, STZ group showed more increase in [bladder NGF] than SUC group at the level above the physiological range. We assessed this difference is caused by hyperglycemia in addition to the adaptive increase of [bladder NGF] for the polyuric state.

In the late phase, we revealed [bladder NGF] in STZ group declines to the half of the values of Control and SUC group. This suggests decrease of [bladder NGF] should be a cause of neurogenic bladder in established diabetes mellitus.

Table

	0 day	7 day	14 day	28 day	56 day	84 day
STZ group	5.05±0.15	29.53±1.81	10.00±0.51	6.16±1.95	2.32±0.66	2.01±1.05
SUC group	4.99±0.22	13.86±0.92	6.06±0.66	5.11±0.49	4.83±1.11	4.95±0.65
CON group	5.01±0.21	4.91±0.19	4.82±0.17	4.99±0.13	5.11±0.16	5.09±0.23