

## Evaluation of the cardiac autonomic nervous system in spontaneously non-insulin-dependent diabetic rats by $^{123}\text{I}$ -metaiodobenzylguanidine imaging

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**Objective:** To evaluate the sensitivity of  $^{123}\text{I}$ -labeled metaiodobenzylguanidine ( $^{123}\text{I}$ -MIBG) scintigraphy in detecting diabetic autonomic nervous system disorders.

**Materials and Methods:** Thirty-one-week-old male Otsuka Long-Evans Tokushima Fatty (OLETF) rats, an animal model of spontaneous non-insulin-dependent diabetes mellitus, were maintained for 8 weeks with or without 30% sucrose solution as a drinking water ( $n = 3$  each). Long-Evans Tokushima Otsuka (LETO) rats ( $n = 3$ ), served as controls. Plasma glucose and insulin levels were measured, and  $^{123}\text{I}$ -MIBG scintigraphy was performed with a gamma camera equipped with a pinhole collimator for animals. Plasma and cardiac tissue catecholamine levels were also determined.

**Results:** Plasma glucose levels of OLETF rats with and without sucrose loading ( $554 \pm 106$  and  $141 \pm 1.5$  mg/dl respectively) were significantly higher than those of LETO rats ( $116 \pm 3.7$  mg/dl). Norepinephrine concentrations in heart and plasma tended to be lower in diabetic rats. The washout rate of  $^{123}\text{I}$ -MIBG in diabetic rats was significantly higher than the rate in control rats. Cardiac uptake of  $^{123}\text{I}$ -MIBG, calculated as % dose/g of tissue, was significantly lower in diabetic rats than in control rats.

**Conclusion:** These results suggest that myocardial  $^{123}\text{I}$ -MIBG scintigraphy is suitable for assessing cardiac sympathetic activity noninvasively in diabetic states, even in the early stages.

**Key words:**  $^{123}\text{I}$ -MIBG, OLETF rats, diabetes mellitus, catecholamine, autonomic nervous system