

RAPID COMMUNICATION

Endogenous Quinidine-like Immunoreactivity in the Serum of Rats after Acute Hypoxia

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Received October 5, 1993

Accepted October 20, 1993

Summary

Quinidine-like immunoreactivity (Abbott TDx Quinidine fluorescence polarization immunoassay) was measured in blood serum of control rats and rats exposed to hypoxia in a hypobaric chamber (7 500 m for one hour). The mean "quinidine" levels (mean±S.D.) were 0.159 ± 0.058 and 0.260 ± 0.110 (μmol quinidine/l serum), respectively ($p<0.01$).

Key words

Quinidine-like immunoreactivity – Hypoxia – Blood – Rats

Recently Schreiber *et al.* (1993) observed presence of quinidine-like immunoreactivity in blood of rats made thyrotoxic by thyroxine feeding. This finding may fit to the knowledge of other endogenous ligands for drug receptors, e.g. endorphins for opiate receptors (Snyder 1984), endogenous nitric oxide for nitrovasodilators (Khana and Furchgott 1992), endogenous digitalis-like factor (Schreiber *et al.* 1981, Gruber *et al.* 1979) and others (endogenous benzodiazepines, endogenous calcium channel blockers).

Since the endogenous quinidine-like factor could display antiarrhythmic activity, it is predictable that it could be present in blood of animals with a tendency to arrhythmia, such as thyroxine-induced thyrotoxicosis. Actually, its presence is linked with an increase in beta-adrenoceptor activity induced by thyroxine (Schreiber *et al.* 1993).

Another situation, in which elevated endogenous quinidine-like (antiarrhythmic?) activity could be expected is hypoxia. After several pilot experiments (examining the time interval after hypoxia was studied) we report here the results of an experiment, in which quinidine-like immunoreactivity was measured by the Abbott TDx quinidine fluorescence polarization immunoassay. Ten control

and ten hypoxic Wistar male rats were examined. Mean body weight was 108 ± 7 g in controls and 107 ± 9 g in hypoxic rats, fed on a standard laboratory diet. The animals were exposed to high-altitude hypoxia in a hypobaric chamber at 7 500 m for one hour. After an additional hour the rats were killed by decapitation and quinidine-like immunoreactivity was measured in their serum. The animals of the control group were exposed to the same manipulations except of high-altitude hypoxia.

A highly significant 72 % increase of endogenous quinidine-like immunoreactivity was observed in the posthypoxic animals, as compared to controls (0.260 ± 0.110 vs 0.159 ± 0.058 μmol quinidine/l serum $p<0.01$). The activity in sera of control rats was slightly higher than in controls of the previous experiment (Schreiber *et al.* 1993) but is the same as in slightly stressed rats. Thus the manipulation with the animals, especially their placing into the hypobaric chamber (without hypobaria), could play a role.

Thus, one hour after the end of acute hypoxia (7 500 m lasting for one hour) an increased quinidine-like immunoreactivity was observed in rat blood. The source and the nature of endogenous quinidine-like activity are unknown, as well as its possible antiarrhythmogenic action.

References

- GRUBER K.A., WHITAKER J.M., PLUNKETT W.C., BUCKALEW W.M. Jr.: Detection of an endogenous digoxin-like substance (endoxin) in plasma of dogs, sheep and man. (Abstract) *Kidney Int.* **16**: 817, 1979.
- KHAN M.T., FURCHGOTT R.F.: Similarities of behaviour of nitric oxide (NO) and endothelium-derived relaxing factor in a perfusion cascade bioassay system. *Fed. Proc.* **46**: 385, 1992.
- SCHREIBER V., KÖLBEL F., ŠTĚPÁN J., GREGOROVÁ I., PŘIBYL T.: Digoxin-like immunoreactivity in the serum of rats with cardiac overload. *J. Mol. Cell. Cardiol* **13**: 107–110, 1981.
- SCHREIBER V., KÖLBEL F., HOSTLOVSKÁ M., NEDVÍDKOVÁ J.: Endogenous quinidine-like immunoreactivity in the serum of rats with cardiac overload, stress or hyperthyroidism. *Cor. Vasa* **35**: 144–146, 1993.
- SNYDER S.H.: Drug and neurotransmitter receptors in the brain. *Science* **224**: 22–31, 1984.
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Reprint Requests

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