Animal Model

Double-Transgenic Rats as a Tool to Study the Function of the Renin-Angiotensin System

Reference Number 03-00184

Abstract

Challenge

The renin angiotensin system (RAS) is the most important regulator of blood pressure. RAS exerts its regulatory function by eliciting several molecular mechanisms leading to an increase in blood pressure, like vasoconstriction, or sodium retention in the kidney, and is furthermore involved in growth processes. In cardiovascular research, the rat has for a long time been the experimental species of choice, combining operational and experimental advantages for studies of cardiovascular parameters like blood pressure. However, the classical animal models for cardiovascuar diseases are marked by major disadvantages, like the lack of a defined genetic specification of the animals or the presence of an activated rodent RAS. Therefore, there is a strong demand for an animal model with a well-defined genotype, allowing a detailed study of human renin angiotensinogen interaction.

Technology

For investigations on the aetiology of hypertension, two transgenic rat lines, TGR(hREN) and TGR(hAOGEN), have been generated, expressing the genes for human renin and angiotensinogen, respectively. Due to the species-specificity of the RAS, ANGII synthesis and cardiovascular physiology in these animals is unaffected by the human transgene. By cross-breeding of TGR(hREN) and TGR(hAOGEN), double-transgenic rats expressing human renin and angiotensinogen can be generated, which produce high amounts of AngII, and develop hypertension followed by overt organ damage of heart and kidney comparable to hypertensive patients. This animal model can be used for studies on species-specific interactions of RAS proteins and for the analysis of protein expression patterns. Furthermore, it provides a system for testing drugs modulating human RAS activity, like renin-inhibitory pharmaceuticals for use in antihypertensive therapy.

Commercial Opportunity

Breeding pairs of TGR(hREN) and TGR(hAOGEN) are available under Tangible Property Licence Agreement.

Further Reading

- Ganten et al., 1992, Proc Natl Acad Sci USA, 89, 7806-7810.
- Luft et al., 1999, Hypertension, 33 (1/2), 212-218.

MDC MAX-DELBRÜCK-CENTRUM FÜR MOLEKULARE MEDIZIN IN DER HELMHOLTZ-GEMEINSCHAFT

Licensing Contact:
Dr Anja Zimmermann
Equity Management & Valuation
T: +49 89 318814-13
zimmermann@ascenion.de

Ascenion GmbH
Herzogstraße 64
D-80803 München
T: +49 89 318814-0
info@ascenion.de
www.ascenion.de