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AGING AND CARDIAC BETA-ADRENOCEPTORS IN TWO RAT STRAINS.

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The effect of aging on the properties of the heart β -adrenoceptors is not clear : receptor density has been found to increase as well as to decrease upon aging, while the percentage of β -receptors coupled to G-proteins (high affinity G-protein binding HA) was either unaffected or decreased (1). Previously, using Wistar rats, the effect of aging on the β -adrenergic signal transduction (β AST)-system in lung and kidney (2). We now extended our studies to rat heart, addressing the following questions (a) has age an effect on β -receptor density and coupling to G-proteins and (b) in how far is the rat strain important.

We used male Wistar (University of Leuven, Belgium) and brown Norwegian rats (EURAGE, Noorderwijk, The Netherlands) of 2-4 months and of 24-26 months. A crude ventricular plasma membrane fraction was prepared as described for lung. We measured receptor density (fmole/mg prot) and competition binding with isoproterenol using [125 Iodo]cyanopindolol.

Our results can be summarized as follows (means \pm SEM).

	White rats		Brown rats	
	young	senescent	young	senescent
B_{max}	69.8 \pm 5.5 (n=6)	48.5 \pm 4.4 (n=6)	42.2 \pm 3.4 (n=5)	42.9 \pm 2.3 (n=5)
% HA	44.3 \pm 5.1 (n=6)	51.0 \pm 7.2 (n=5)	31.9 \pm 4.5 ^a (n=6)	32.2 \pm 3.9 ^{a,b} (n=6)

^a : p<0.05 versus the corresponding value for white rats ;

^b : p<0.05 versus the corresponding value for young rats.

With age, the percentage of G-protein coupled receptors increases in white rats, and is unchanged in brown rats, while receptor density decreases in white rats and is unchanged in brown rats. Hence, we conclude that the effect of age on the biochemical characteristics of the β AST-system in rat heart is dependent on the strain of rats.

1. P.J. Scarpace, N. Tumer and L. Mader. β -Adrenergic functions in aging, basic mechanisms and clinical implications. *Drugs and Aging* 1, 116 (1992).

3. N. Fraeyman, E. Van de Velde and P. Vanscheeuwijck. Effect of aging on the β -adrenergic signal transduction system in rat kidney, lung, and mononuclear leukocytes. *Biological Signal Transduction*, 193 (1991).