

CHAPTER FOUR:
RESULTS

MORPHOLOGICAL DATA

The body mass of the aged rats was an average of 18% less than that of the adult rats (Table 1). In addition, absolute gastrocnemius mass was depressed by 33% in aged rats when compared to adults. This difference was not eliminated when gastrocnemius mass was normalized by body mass as specific mass of the gastrocnemius was depressed by 19% in the aged animals compared to the adults.

SR FUNCTION - Ca²⁺ UPTAKE

The isolation procedure resulted in different protein yields between the two groups of rats (Table 1). In the aged rats, 57% less protein was recovered than in the adult rats. However, gel electrophoresis showed that the percentage of protein attributed to the Ca²⁺ ATPase was not noticeably different between groups.

The control SR Ca²⁺ uptake rate, (i.e. stimulated by MgATP) was nearly 20% less in the aged rats compared to the adults (Table 2). In each group, HOCL caused significant depressions in uptake rate. However, the percent reduction in uptake was not significantly different between groups. This suggests that HOCl does not adversely affect the functioning of the Ca²⁺ ATPase in aged rats.

SR FUNCTION - Ca²⁺ RELEASE

All SR Ca²⁺ releases were stimulated in Ca²⁺ loaded vesicles and after inhibition of the Ca²⁺ ATPase by CPA. In all samples tested, AgNO₃ - and H₂O₂ -stimulated as well as passive releases were apparent (Table 3). The rate of passive SR Ca²⁺ releases (CPA

only) was not different between groups. This suggests that SR vesicles obtained from aged rats are no more “leaky” to Ca^{2+} than are those obtained from adults.

Ca^{2+} releases stimulated by AgNO_3 was significantly depressed by 20% in the aged rats. Release stimulated by H_2O_2 was substantially slower than that elicited by AgNO_3 . In addition, the rates elicited by H_2O_2 were not significantly different between groups.

However, when the rate of H_2O_2 -stimulated release was normalized by the AgNO_3 -stimulated rate, the aged rats showed a 40% increase in rate. This suggests that the Ca^{2+} release channel of aged rats is more susceptible to the effects of H_2O_2 as compared to adult rats.

Table 1. Morphological Data

	12m ADULT	27m AGED	% DIFF
Body Mass (g)	449.3±6.0	368.7±9.6 ^a	-18
Gastronemius Mass (g)	1.9±.056	1.267±.06 ^a	-33.3
Gastronemius Mass (mg/g)	4.229±.115	3.429±.095 ^a	-18.9
SR Yield (ug/mg)	0.551±.096	.236±.063 ^a	-57.1

^ap<.05 between adult and aged animals

Table 2. Effect of HOCl on Ca²⁺ Uptake (nmol/mg/min)

	ADULT	AGED	% DIFF
Control	106.09±5.4	85.17±3.72 ^a	-19.7
HOCl	86.11±7.34 ^b	63.5±5.05 ^{a,b}	-26.3
% Reduction	28.06±3.07	25.12±3.09	

^ap<.05 between adult and aged animals

^bp<.05 between treatments

Table 3. Effect of H₂O₂ on Ca²⁺ Release (nmol/mg/min)

	ADULT	AGED
AgNO ₃	30.46±3.08	17.94±1.95 ^a
H ₂ O ₂	7.18±1.15	7.39±.44
Passive	1.24±.09	1.03±.10
H ₂ O ₂ /AgNO ₃	0.26±.04	0.40±.04 ^a

^ap<.05 bwteen adult and aged animals