HEAT PRODUCTION BY CA^{2+} ATPASE IN RAT AND RABBIT SKELETAL MUSCLE

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Sarcoplasmic reticulum (SR) Ca^{2+}-ATPase (SERCA) plays an important role in thermogenesis through the uncoupled ATPase activity (ATP hydrolysis without Ca^{2+} transport). SERCA 1 isoform is found in white muscles and rat brown adipose tissue (BAT), while red muscle expresses both SERCA 1 and SERCA 2a. In rats, BAT is the primary site of heat production. However, in adult humans and rabbits, BAT is little developed, and skeletal muscle seems to be the main thermogenic site. In this study we aimed to compare the thermogenic contribution of SERCA in skeletal muscles from rabbit and rat. We verifyed that the rate of Ca^{2+} uptake and the amount of heat production during ATP hydrolysis are greater in rabbit white muscle than in the rat one. In addition, the amount of heat released per mol of ATP cleaved ($?H^{cal}$) is two times higher in rabbit white muscle compared to the same tissue in the rat. In red muscles, however, the rate of Ca^{2+} transport, ATPase activity and also the amount of heat released are significantly lower in rabbits when compared to rat muscles. We show that heat production by SERCA significantly differs between rat and rabbit skeletal muscle subtypes.