

Sarcoglycans and integrins in masseter muscle of baboons: an immunohistochemical and molecular study

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The sarcoglycans subcomplex consists of six transmembrane proteins ($\alpha, \beta, \delta, \gamma, \epsilon, \zeta$), functionally connected by a bidirectional signalling with integrins, transmembrane receptors that play a key role in cell adhesion and differentiation. $\beta 1D$ -integrin is detected only in skeletal and cardiac muscle, while low amounts of $\beta 1A$ were detected in striated muscles. $\beta 1D$ was associated with $\alpha 7A$ and $\alpha 7B$ in adult skeletal. Although numerous studies have been carried out on these proteins in many muscle types, insufficient data exist on their behaviour in masseter muscle, an highly unusual muscle for the presence, in addition to slow and fast fibers, of hybrid fibers types important for the specific functional demands of masseter.

Our studies on normal human masseter muscle and on masseter of subjects with right crossbite, showed that integrins play a role in the functional activity of muscle and in the optimization of contractile forces. Also, we studied these proteins in masseter of chimpanzees, alpha and non-alpha male subjects. These results have shown a different quantitative composition of integrins in alpha male in respect to non-alpha male hypothesizing a key role for integrins and sarcoglycans in the determination of contraction force.

Here, we analyzed masseter muscle obtained from baboons, animals similar in phylogeny with humans and chimpanzees, individuating subjects with high and low dominance. Our immunohistochemical results, confirmed also by Western Blotting analysis, show that, in high dominance subjects, stainings for sarcoglycans and integrins were normal; interestingly, in low dominance subjects stainings for these proteins were normal, lower or absent in different fibers of the same microscopic field. Thus, preliminary analysis on cell cultures of myoblasts and myotubes, at different days of differentiation, immunolabelled with antibodies against sarcoglycans and integrins, have demonstrated a similar behaviour, showing cells with an higher or lower staining for these proteins. In our opinion, these results provide the first suggestion that integrins and sarcoglycans in masseter muscle play a key role regulating muscular functional activity and allowing the optimization of contractile forces of this muscle.

Keywords: Baboons, sarcoglycans, integrins.