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ABSTRACT OF VOLUNTEER PAPER

EQUILIBRIUM OF NUCLEOTIDES IN STIMULATED FROG MUSCLES. P. Canfield and G. Maréchal
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Creatine (C), phosphorylcreatine (PC), ATP, ADP, AMP and IMP have been assayed in perchloric acid extract of 144 frog sartorius muscles (half of them being poisoned with iodoacetate). The muscles have been frozen at the end of one isometric tetanus (20C) before they could relax. The ratio C/PC increases with duration of stimulation, from 0.45 for resting muscle to 8.4 for iodoacetate poisoned muscles stimulated 12 sec. In a first approximation, the associated changes in ATP, ADP and AMP agree with a simple model: a) ATP and AMP are free in sarcoplasm, ADP is partly bound, partly free; bound ADP is taken as equal to ADP of resting muscle and is excluded from the enzymatic equilibrium; b) the ATP-PC transferase reaction has an in vivo equilibrium constant of 28; c) the myokinase reaction has an in vivo equilibrium constant of 0.15. However, when C/PC is in the range 2 to 6, ATP is higher and AMP is lower than predicted by the model. When C/PC goes over 2, an IMP production occurs which is always higher than AMP production; this suggests that deamination of AMP stabilizes ATP at a level higher than that predicted by a simple equilibrium model.