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Suppressor Of Yoda (SOY) Plays a Signal Transduction Role in Skeletal Muscle Contraction

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The protein *Suppressor Of Yoda* (SOY), was demonstrated to play a critical role in the signal transduction pathway that controls skeletal muscle contraction in mouse muscle cells. We infected mouse myoblasts with an MSG vector containing the *soy*$^+$ gene under the control of the *Metallica* promoter. Heavy metal induction resulted in a 105 decibel increase in the expression of this gene. Upon overexpression, 96% of the SOY protein within the cells was shown by immunoprecipitation to be complexed to the SOS protein that plays a role in the MAP kinase signal transduction pathway, although there was no noticeable effect on the cells. Small amounts of the SOY-SOS complex were also detected in the absence of induction. However, when we examined a *soy* mutant that lacks the 3'UTR of the gene (Kikkoman, 1993), the SOY-SOS complex was entirely absent, and contraction of skeletal muscle was impaired.

Key Words: Lock, Tumbler, Gate, Deadbolt, G# Minor

Despite the fact that skeletal muscle has been observed in almost every human subject yet examined (Atlas and La Lane, 1974), the mechanism of the regulation of muscle contraction is unclear. A mouse mutant has been recently described in which the force generated by skeletal muscle myosin on actin filaments fluctuates significantly. Because of its control of the force, this mutant was named *yoda* (Lucas and Spudich, 1991). We recently reported the discovery of *suppressor of yoda (soy)*, a mutation that not only suppresses *yoda*, but also supresses free speech and radical anti-government activities (McCarthy *et al.*, 1992). In this report, we demonstrate that the gene product SOY forms a complex with the SOS protein *in vivo* that is necessary for efficient contraction of skeletal muscle, and, in large quantities, makes the muscle tissue taste good after heat treatment.

MATERIALS AND METHODS

Construction of plasmids. A *soy* cDNA clone underwent a *NotI*/*ButII* double digest, resulting in a fragment that could be cloned into the MSG vector at the *SnotI* site (Seung and O'Connor, 1990). The plasmid was propagated in the *E. pluribus* strain TGIF.

Immunoblotting. Cells were disrupted in a coffee grinder (Krupps, Hackensack, NJ). Whole cell extracts were electrophoresed and transferred to nitrocellulose using standard methods. Protein bands were visualized using the Sharpie marker system (Sanford, Bellwood, IL).

RNase protection assays. The RNase Protection Agency was notified following the