

INTRACELLULAR RECORDING FROM EXTENSOR MOTONEURONES ACTIVATED ACROSS THE GAMMA LOOP. R. Granit, J.-O. Kellerth* and A. J. Szumski^{*1}. Nobel Inst. for Neurophysiol., Karolinska Inst., Stockholm, Sweden.

Ventral horn motoneurones of the gastrocnemius-soleus muscle in the otherwise denervated leg were fired across the gamma loop by stimulation of the peripheral stump of the cut ventral root. Conventional K-citrate or KCl microelectrodes were used for intracellular recording and stimulating these neurones by currents injected through the tip of the microelectrode. Very high frequencies of stimulation (140-500/sec) were necessary for optimal firing of the motoneurones across the loop; extrafusal and intrafusal muscle fibers were contracted. Selective cocaine paralysis of the gamma fibers prevented firing across the loop. Selective paralysis of extensor muscle alpha end-plates by Flaxedil enhanced the effect by removing the contractile tension, which by post-synaptic inhibition from the tendon organs antagonized activation across the loop. The intrafusal fibers containing the excitatory receptors differ from the extrafusal ones in that they produce durable states of contraction to high frequency stimulation. This is shown to agree with recent results on contractile properties of intrafusal fibers. The gamma loop emerges as a definite motor route. (Grant Support: Swedish Med.Res.Council. ^{*1}Vocational Rehab.Admin.Res.Fellow.)