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La force redéveloppée par un muscle strié après un raccourcissement à vitesse contrôlée.

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The force developed by a muscle stretched after shortening at controlled speed.

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Sartorius muscles of Rana temporaria are tetanized at 0°C. The contraction is isometric during the first second, then the muscle is shortened at a constant velocity from l_o + 1.1 mm (*long length*) to l_o -1.1 mm *(short length*). After the end of the movement, the tetanic stimulation is prolonged, in order to observe the redeveloped force. One repeats this type of contraction, changing the speed of shortening (according to a so-called "mirror" order). These tetani with change of length are placed between two isometric tetani obtained either at the *long length* or at the *short length*.

The force redeveloped after a prior shortening is always smaller than the force maintained at a corresponding time of a tetanus only isometric, whether it is at the "long" or "short" length. The deviation depends on the speed of the shortening. This confirms previous experiments (Abbott and Aubert, 1952, Aubert, 1956).

We have obtained a quantitative description of this phenomenon, expressing the redeveloped force as a function of the speed of the preliminary shortening. This force is normalized in two ways: (1) the maximum force cannot be used because this maximum occurs after a duration of stimulation which increases as the speed of the preliminary relaxation decreases. The strength of the muscle decreases slightly during an isometric tetanus. To correct for this effect of fatigue, we suppose it to be linear, and extrapolate the force redeveloped at the moment when movement begins. This extrapolated force is defined P_d. (2). P_d is normalized with respect to the force P_m, which is the isometric force maintained just before the shortening begins. In addition, we define P_c as the force of the isometric tetanus at *short length*, measured at the moment corresponding to that at which P_m or P_d were measured.

The dependence between these forces is simply described by the equation

$$P_d / P_m = P_c / P_m - A \exp(-V/\alpha)$$

where V is the speed of shortening in cm.sec^{-1}. In 11 experiments, we found that $P_c / P_m = 0.95 \pm 0.02$; $A = 0.13 \pm 0.01$ and $\alpha = 0.72 \pm 0.06$ cm. sec^{-1}.

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