
The mechanics of muscle contraction

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Résumé

How does a human lift a weight? Can we relate the dynamics of the lift to the molecular actin-myosin interactions responsible for muscle contraction? We address these questions with bench press experiments that we analyse with a theoretical model, based on the sliding filament theory. From the agreement, we show that there is a link between the dynamics of a gesture at our macroscopic scale and the physiological processes at micro/nanometric scale. And we use this link as a non invasive tool to reveal physiologic characteristics of muscles of people revealing their myotypology (slow/fast twitch fibers) or possible deseases. To go further into the complexity of human movement with the same spirit, we try to investigate the nervous control of muscle with simple experiments like aiming a target with a laser pointer and to dig physical laws.

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