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**Motion of a rigid sphere through an elastic tube with a lubrication film** MARIE TANI, THOMAS CAMBAU, JOSE BICO, ETIENNE REYSSAT, PMMH-ESPCI, PARISTECH — The motion of large objects through narrow tubes is a common problem in physiology and more generally in the biological world. We built a model experiment where a rigid sphere is moved inside a narrower elastic tube coated with a lubricating fluid. The friction force is generally lower than in a non-lubricated situation. Interestingly, the force increases with the pulling velocity to the power  $1/3$ , and also depends on the viscosity of the lubricant, the geometry and the mechanical properties of the tube. All our experimental data are well described by a scaling law combining lubrication and elasticity equations. We furthermore measured the thickness of the lubricant film. We present all these results.

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