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Flow Rate In Microfluidic Pumps As A Function Of Tension and Pump Motor Head Speed[1] ANTHONY IRWIN, KRISTA MCBRIDE, Belmont University — As the use of microfluidic devices has become more common in recent years the need for standardization within the pump systems has grown. The pumps are ball bearing rotor microfluidic pumps and work off the idea of peristalsis. The rapid contraction and relaxation propagating down a tube or a microfluidic channel. The ball bearings compress the tube (occlusion) and move along part of the tube length forcing fluid to move inside of the tube in the same direction of the ball bearings. When the ball bearing rolls off the area occupied by the microfluidic channel, its walls and ceiling undergo restitution and a pocket of low pressure is briefly formed pulling more of the liquid into the pump system. Before looking to standardize the pump systems it must be known how the tension placed by the pumps bearing heads onto the PDMS inserts channels affect the pumps performance (mainly the flow rate produced). The relationship of the speed at which the bearings on the motor head spin and the flow rate must also be established. This research produced calibration curves for flow rate vs. tension and rpm. These calibration curves allow the devices to be set to optimal user settings by simply varying either the motor head tension or the motor head speed.

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