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Effects of Viscosity on the Performance of Air-Powered Liquid Jet Injectors ROCCO PORTARO, HADI JABER, HOI DICK NG, Concordia University — Drug delivery without the use of hypodermic needles has been a long-term objective within the medical field. This study focuses on observing the effects of drug viscosity on injector performance for air-powered liquid jet injectors, as well as the viability of using this technology for delivering viscous-type medications such as monoclonal antibodies. The experiments are conducted through the use of a prototype injector which allows key parameters such as driver pressure, injection volume and nozzle size to be varied. Different viscosities which range from 0.9 cP to 87 cP are obtained by using a water-glycerol mix. The liquid jets emanating from the injector are assessed using high speed photography as well as a pressure transducer. Experimental findings are then compared to a CFD model which considered experimental geometry and parameters. The results of this study highlight the effect of viscosity on the operating pressure of the injector and the reduction in jet stagnation pressure. It also illustrates improved jet confinement as viscosity is increased, a finding which is in line with the numerical model, and should play a key role in improving the device's characteristics for puncturing skin.

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