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Spontaneous oscillations in microfluidic networks DANIEL CASE, Northwestern University, JEAN-REGIS ANGILELLA, Universit de Caen, ADILSON MOTTER, Northwestern University — Precisely controlling flows within microfluidic systems is often difficult which typically results in systems being heavily reliant on numerous external pumps and computers. Here, I present a simple microfluidic network that exhibits flow rate switching, bistablity, and spontaneous oscillations controlled by a single pressure. That is, by solely changing the driving pressure, it is possible to switch between an oscillating and steady flow state. Such functionality does not rely on external hardware and may even serve as an on-chip memory or timing mechanism. I use an analytic model and rigorous fluid dynamics simulations to show these results.

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