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Mode Transition of RNA Trap by Electric and Hydraulic Force Field in Microfluidic Taper Shape Channel YUZURU TAKAMURA, Jpn. Adv. Inst. of Sci. and Tech. (JAIST) and PRESTO/JST, KUNIMITSU UENO, WAKO NAGASAKA, YUICHI TOMIZAWA, EIICHI TAMIYA, Jpn. Adv. Inst. of Sci. and Tech. (JAIST) — We have discovered a phenomenon of accumulation of DNA near the constricted position of a microfluidic chip with taper shaped channel when both hydro pressure and electric field are applied in opposite directions. However, RNA has not been able to trap so far, unlike huge and uniformly double stranded DNA molecules, RNAs are smaller in size and single stranded with complicated conformation like blocks in lysed cell solution. In this paper, we will report not only large but also small RNA (100∼10b) are successfully trapped in relatively large microfluidic taper shape channel (width >10um). RNA are trapped in circular motion near the constricted position of taper shape channel, and the position and shape of the trapped RNA are controlled and make mode transition by changing the hydraulic and the electric force. Using this technique, smaller size molecule can be trapped in larger micro fluidic structure compared to the trap using dielectrophoresis. This technique is expected to establish easy and practical device as a direct total RNA extraction tool from living cells or tissues.

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