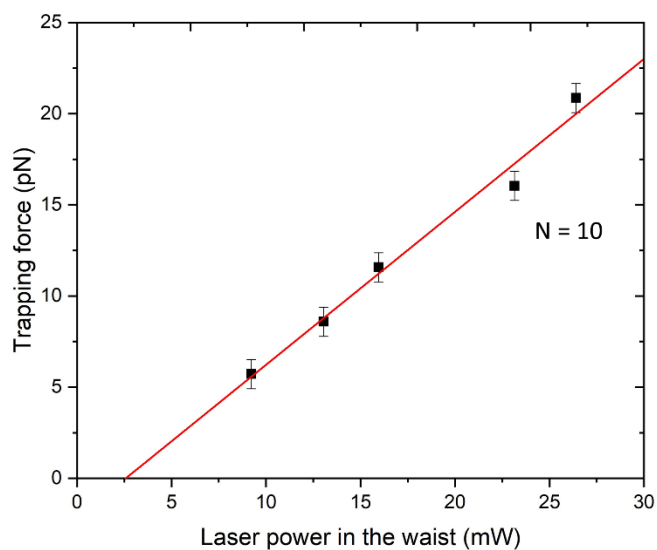


$$F_{trap} = F_{visc}$$

$$F_{trap} = aP$$

$$F_{visc} = 6\pi\eta r\nu K$$

$$K = \frac{\frac{4}{3}(\beta^2 - 1)}{\frac{(2\beta^2 - 1)}{(\beta^2 - 1)^{1/2}} \ln \left[ \beta + (\beta^2 - 1)^{1/2} \right] - \beta}$$



**Supplementary Figure S1.** The calibration of the laser tweezers set up by comparing the optical trapping force with the viscous drag force.