Quantitative analysis of YAP mechanical response and distribution mechanism using an AFM-STORM coupled techniques

Hongru Li ^{a, b, #}, Yong Liu ^{a, #}, Jinrui Zhang ^a, Mingjun Cai ^a, Ziran Cao ^a, Jing Gao ^a, Haijiao Xu ^a, Lina Shao ^a, Jiayin Sun ^a, Yan Shi ^{a, *}and Hongda Wang ^{a, b, *}

^aState Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, Jilin, China. ^bUniversity of Science and Technology of China, Hefei 230026, Anhui, China.



Supporting Information

Figure S1. Schematic diagram of the combination of AFM and SMLM.



Figure S2. Working view of the super-resolution and atomic force microscope coupling platform. (A). Coaxial atomic force cantilever and objective lens under the field of view; (B). The cantilever of modified goblet under bright field acts on the nucleus of living cells. (C). Force curve of B.



Figure S3. The STORM images of YAP distribution after different mechanical forces were applied to the cells. Scale bar, 5 μ m.



Figure S4. The STORM image of YAP distribution after mechanical force was applied to the cells for different time. Scale bar, 5 μ m.



Figure S5. Clusters analysis by SR-Tessler methods. (A). Representative localization map of YAP after dSTORM reconstruction. (B). Identification of objects after thresholding the object density $\delta i^1 > \delta$. (C). extracted clusters (green districts covered on the blue regions) with a higher localization density than the average localization density of all objects. (D-F). Histogram of different clustering parameters, cluster diameters (D), cluster areas (E), cluster circularity (F). Scale bars, 1 µm.



Figure S6. Fluorescence microscope image under 100x objective after transfection of YAP with PSmOrange. Scale bar, 4 μ m.



Figure S7. Fluorescence intensity distribution of YAP over time when mechanical force is applied to live cells. Scale bar, $5 \,\mu$ m.



Figure S8. Example of YAP fluorescence images and intensity color maps. (A,C). 30 nN force (10 min); (B,D). 30 nN force (15 min). Scale bar 5 μ m.



Figure S9. Effect of starvation on YAP nuclear translocation. (A). dSTORM image of YAP without serum. (B). 30 nN force applied to nuclear for 30min in the same condition of A. (C). Nuclear/cytosolic YAP ratio analysis. Scale bar 4 μ m. The statistical results were obtained from ten cells in three independent experiments. ns., no significance. (two-tailed unpaired t-test).