Supplementary information

Figure S1. Measurement of mechanical force required for cell extrusion.

(A) Calibration of the magnitude of the laser impulsive force using AFM. The calibration curve (dotted line) was estimated from laser energies, which are plotted at three points (30, 50, and 70 nJ/pulse). Because the bending movement of the AFM cantilever was too small, we could not evaluate $F_0$ around $L = 10$ nJ/pulse by the AFM calibration. Therefore, the $F_0$ in the range 10-30 nJ/pulse was extrapolated by Eq. [1] (red dotted line). Because the linear correlation between $R^2$ and $F_0$ was uniformly indicated in the range 10-30 nJ/pulse and 30-50 nJ/pulse which is in the AFM detection range, we consider that the extrapolation is reliable. (B) Actomyosin ring size was plotted against laser pulse energy ($n = 15$), revealing a linear positive correlation (correlation coefficient, $R^2 = 0.88$).
**Movie 1. Dynamic changes of F-actin during cell extrusion.**

The center of an epithelial cell in the Lifeact-GFP–overexpressing embryo was directly irradiated with a single pulse of the femtosecond laser (15 nJ/pulse) at time = 0 s. Scale bar: 10 µm. F-actin ring was generated at around 120 s, and subsequently tightened.
Movie 2. Dynamic changes of myosin II during cell extrusion.

The center of an epithelial cell in the MRLC-GFP–overexpressing embryo was directly irradiated with a single pulse of the femtosecond laser (15 nJ/pulse) at time = 0 s. Scale bar: 10 µm. Myosin II accumulated at the membranes of cells surrounding the dying cell at around 120 s, and persisted throughout cell extrusion.
Movie 3. Counter-balancing of actomyosin ring contraction by impulsive force.
The center of an epithelial cell in the Lifeact-GFP–overexpressing embryo was directly irradiated with a single pulse of the femtosecond laser (15 nJ/pulse) at time = 0 s. After formation of the actomyosin ring at around 120 s, impulsive forces generated by femtosecond laser (25 nJ/pulse) were loaded onto the center of the actomyosin ring 50 times at 1 s intervals (red dots in 138–187 s). Scale bar: 10 µm.
Movie 4. Effect of Y27632 for cell extrusion.

Lifeact-GFP–overexpressing embryos were treated with Y27632 for 1 h. The center of an epithelial cell in the Y27632-treated embryo was directly irradiated with a single pulse of the femtosecond laser (15 nJ/pulse) at time = 0 s. Under this condition, actomyosin ring formation occurred, but cell extrusion was delayed. Scale bar: 10 µm.
Movie 5. Effect of Blebbistatin for cell extrusion.

Lifeact-GFP–overexpressing embryos were treated with Blebbistatin for 1 h. The center of an epithelial cell in the Blebbistatin-treated embryo was directly irradiated with a single pulse of the femtosecond laser (15 nJ/pulse) at time = 0 s. Under this condition, actomyosin ring formation occurred, but cell extrusion was delayed. Scale bar: 10 µm.