# Supporting Information

## Takaku et al. 10.1073/pnas.1221341110

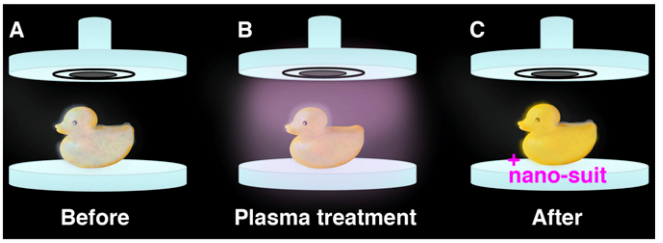



**Fig. S1.** (*A–C*) Schematic drawing of surface modification by plasma. A specimen is set into a standard ion-sputtering device whose metal emitter has been removed (*A*). Materials covering on the entire specimen are irradiated with plasma inside this device for 3 min (*B*). A flexible nano-suit is formed (*C*).

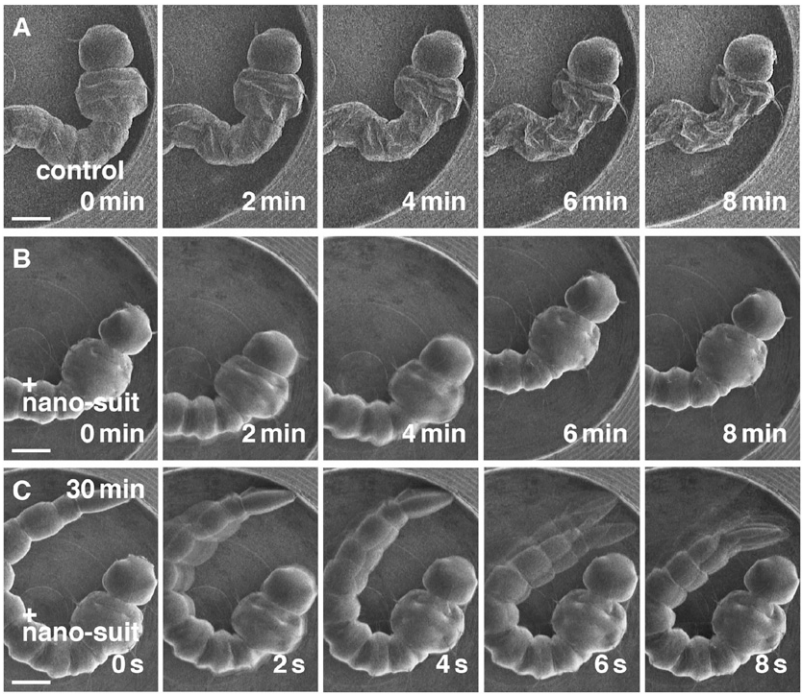



**Fig. S2.** (*A* and *B*) Comparison of treatments with distilled water and Tween 20 solution of a larva of the mosquito *Aedes albopictus*. The larva cultured in distilled water shows rapid shrinkage during SEM observation (*A*). The larva of *A. albopictus* treated with 1% Tween 20 retains its morphology when observed by SEM (*B*). Sequential images show movements of the living mosquito larva exposed to high vacuum with electron-beam irradiation for 30 min (*C*). Blurred images (*B* and *C*) indicate active movements. (Scale bars: 0.5 mm.)

**Fig. S3.** The adult mosquito developed from the larval *Aedes albopictus* that 3 d earlier had been observed under SEM. (Scale bar: 1 mm.)

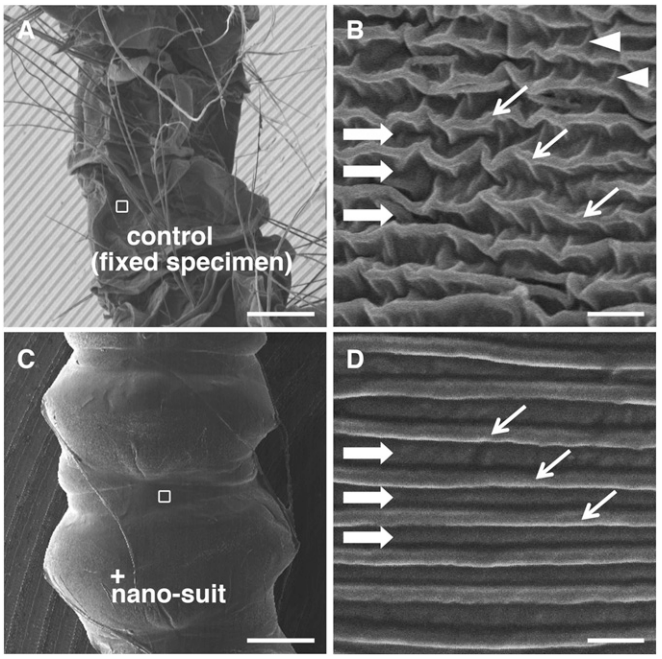



**Fig. S4.** (*A*–*D*) Comparison of two types of sample preparation when viewed with SEM. (*A* and *B*) High-magnification images of a mosquito larva, *Aedes albopictus*, prepared for conventional SEM observation. (*C* and *D*) Images of a larva protected by electron-beam-irradiated Tween 20 as described in this paper. The small white squares in *A* and *C* are shown magnified (*B* and *D*, respectively), with high resolution. [Scale bars: 0.3 mm (*A* and *C*) and 1 μm (*B* and *D*).]

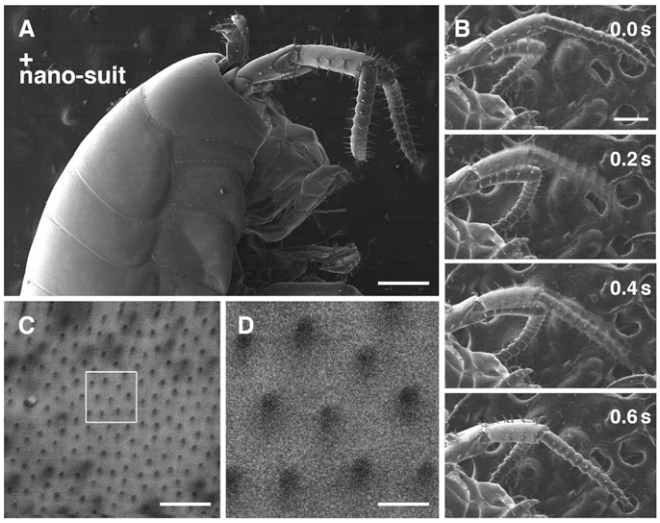



**Fig. S5.** (*A*) The head and thoracic part of a living amphipod *Talitrus saltator* treated with 1% Tween 20 retains its morphology when observed by SEM. (*B*) Active movement of an antenna observed for 0.6 s. (*C*) Dorsal ridge of the basiopod of the sixth pereiopod. A small white square in *C* is shown magnified (*D*) with high resolution. [Scale bars: 200 μm (*A*), 100 μm (*B*), 1 μm (*C*), and 200 nm (*D*).]

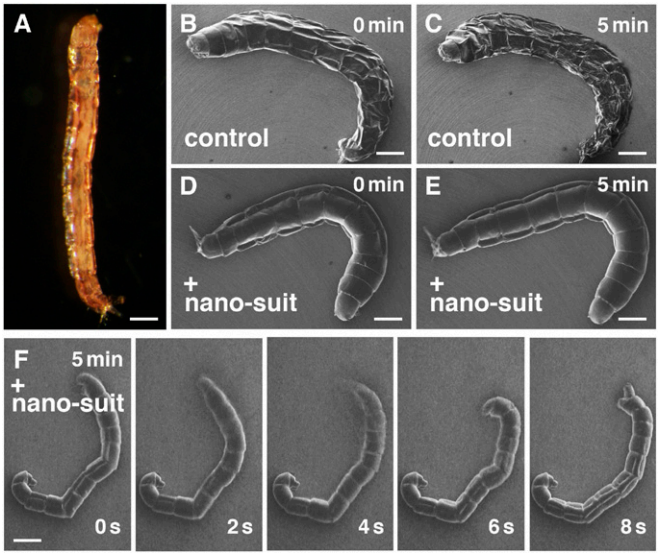
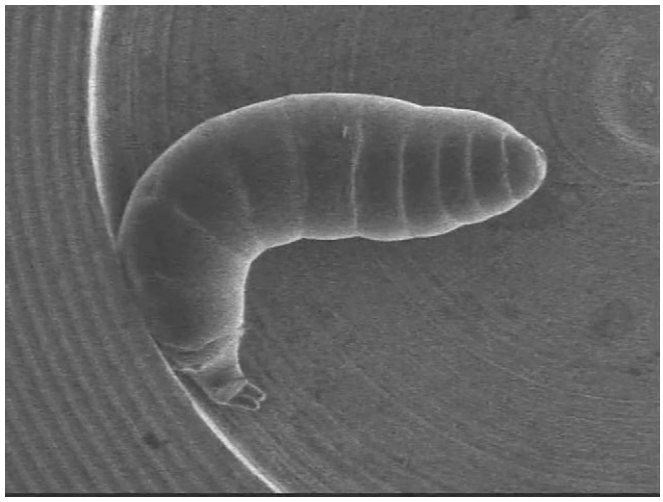
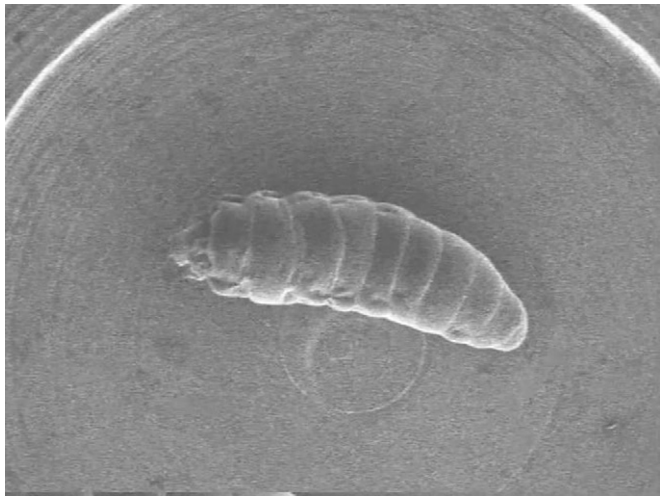



**Fig. S6.** (*A*) Light microscopic observation of a larval midge (*Chironomus yoshimatsui*), which has no natural extracellular substance layer. Comparison of treatments with distilled water and Tween 20 solution of the larva. (*B* and *C*) A living larva was exposed to high vacuum with electron-beam radiation in the SEM, showing rapid dehydration-related collapse within 5 min. (*D* and *E*) The larva pretreated with 1% Tween 20 retains its morphology within 5 min. (*F*) Sequential SEM images showing movements of a living larva treated with 1% Tween 20 and plasma irradiation for 3 min, and then observed by SEM for 5 min. Blurring images indicate active movements. (Scale bar: 0.3 mm.)



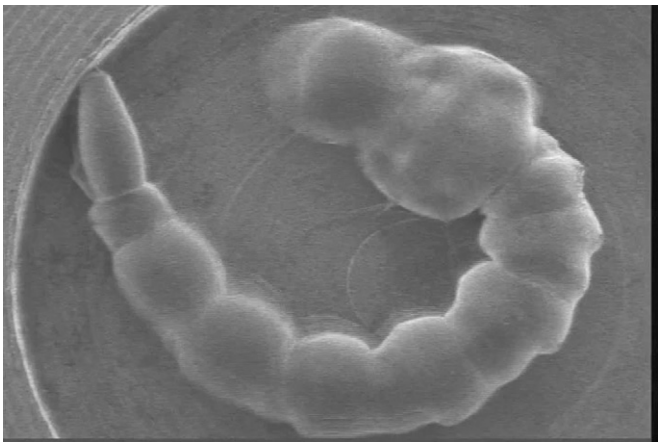
**Movie S1.** Movements of a living larva of *Drosophila* observed by SEM. The untreated animal was irradiated with an electron beam (5.0 kV) and exposed to high vacuum ($10^{-5}$ to $10^{-7}$ Pa) for 60 min (compare Fig. 1 *C* and *D*).

Movie S1



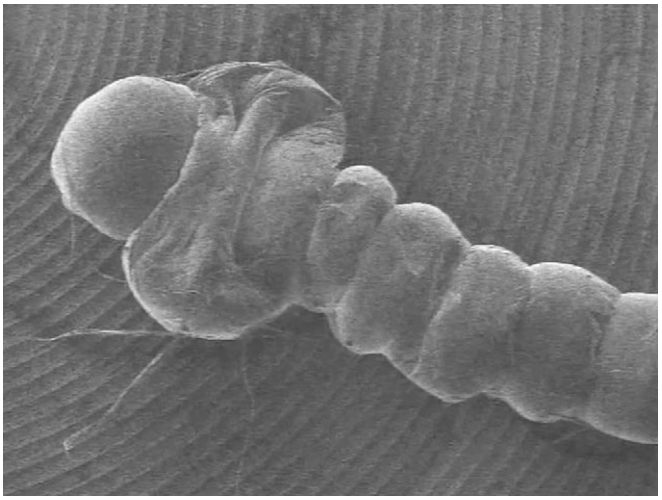
**Movie S2.** Movements of a living larva of *Drosophila* pretreated by plasma irradiation for 3 min and observed by SEM for 60 min (compare Fig. 2 *C* and *D*).

Movie S2



**Movie S3.** Movements of a living larva of the mosquito *Aedes albopictus* covered with 1% Tween 20 and observed by SEM. Although exposed to high vacuum, the animal showed active movements for 30 min (compare Figs. S2*C* and S4 *C* and *D*).

Movie S3



**Movie S4.** Movements of a living larva of the mosquito *Culex pipiens molestus* observed by SEM following pretreatment with the plasma polymerization method. In brief, the surface of the animal was covered with 1% Tween 20 and irradiated in rarified air-derived plasma (*Materials and Methods*) for 3 min. Although exposed to high vacuum, the animal showed active movements for 30 min (compare Fig. 2 *M* and *N*). The ordered fine structures shown in Fig. 2*N* were observed at the end of this movie.

Movie S4