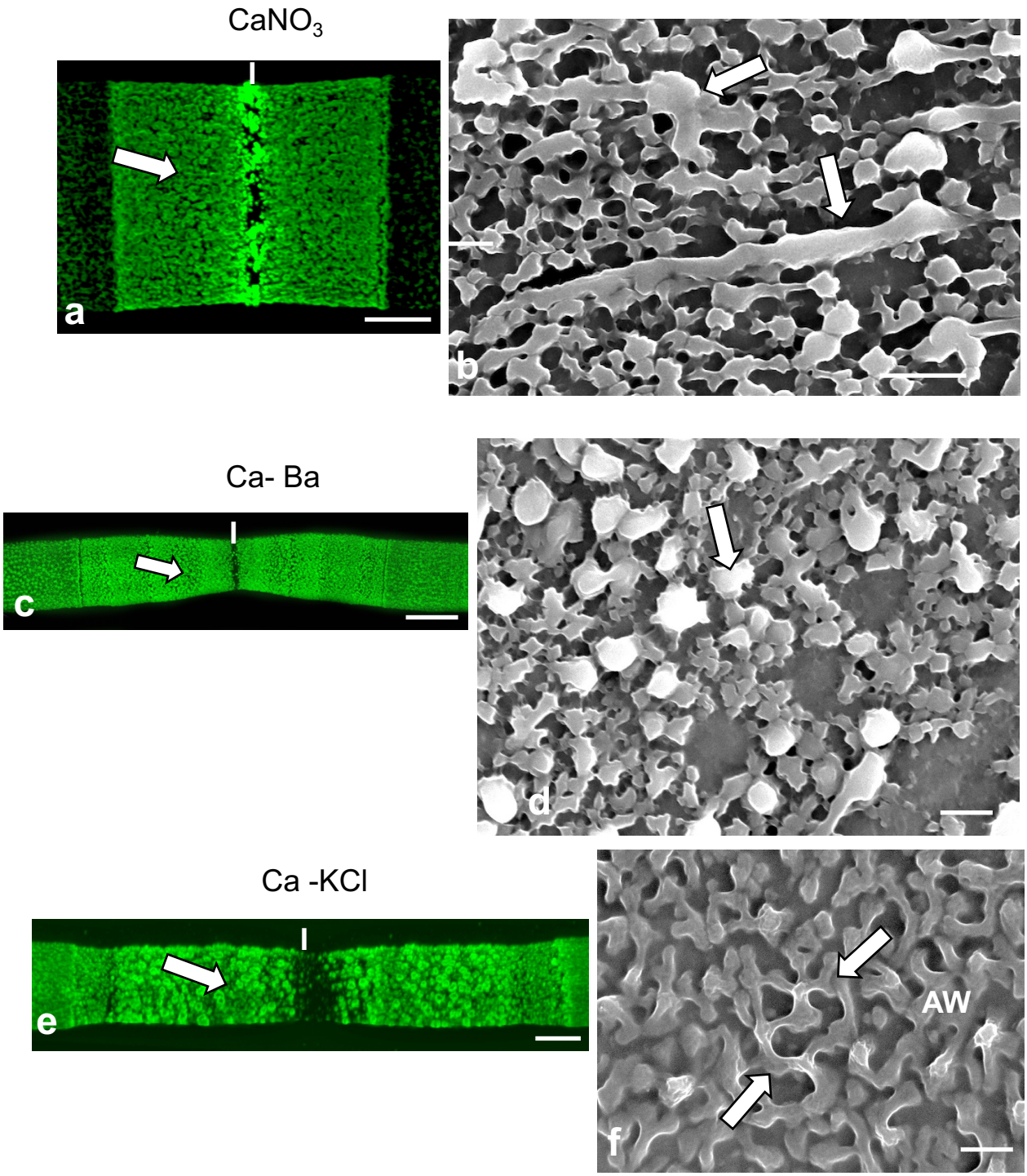
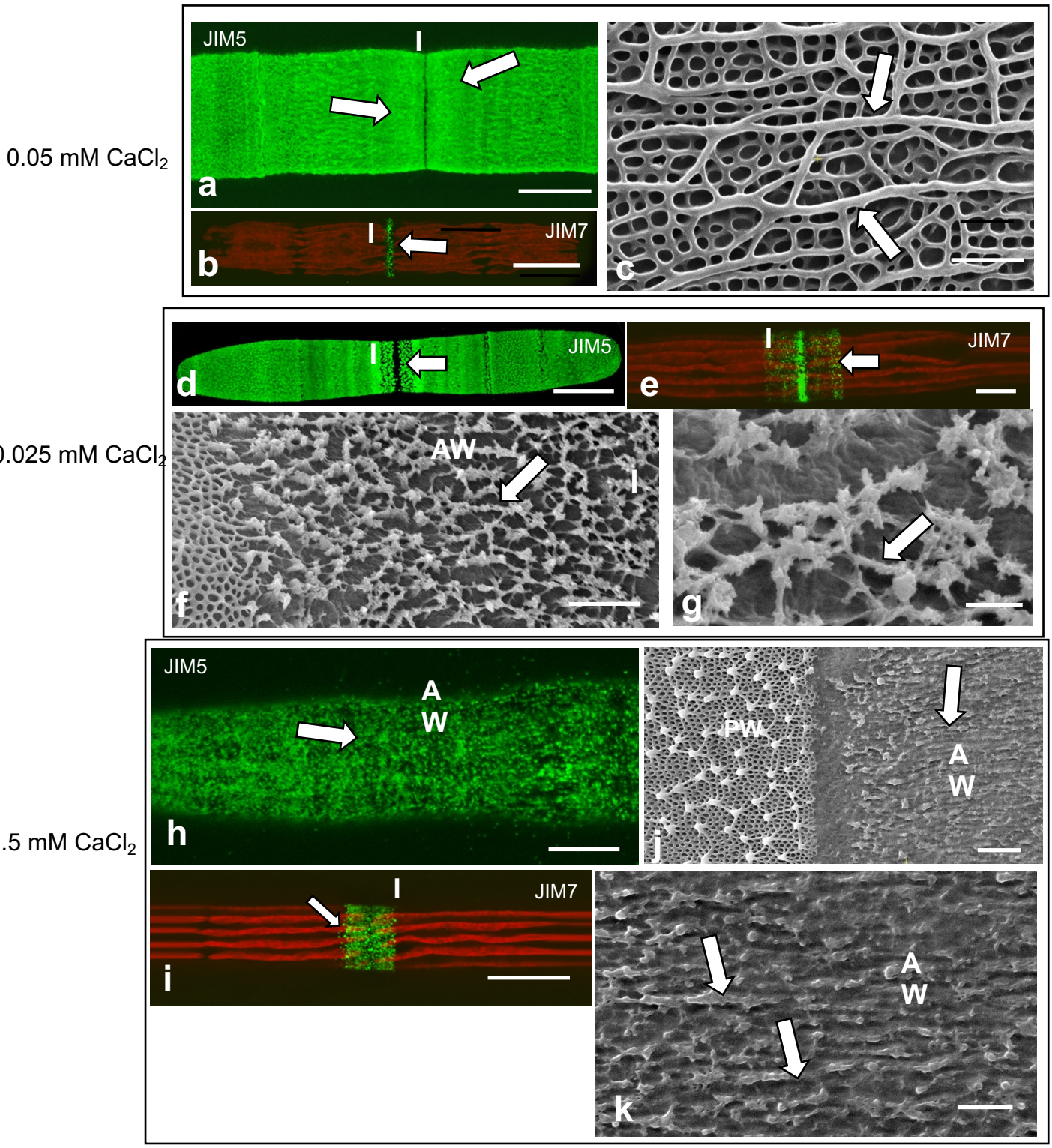
Online Resource 1



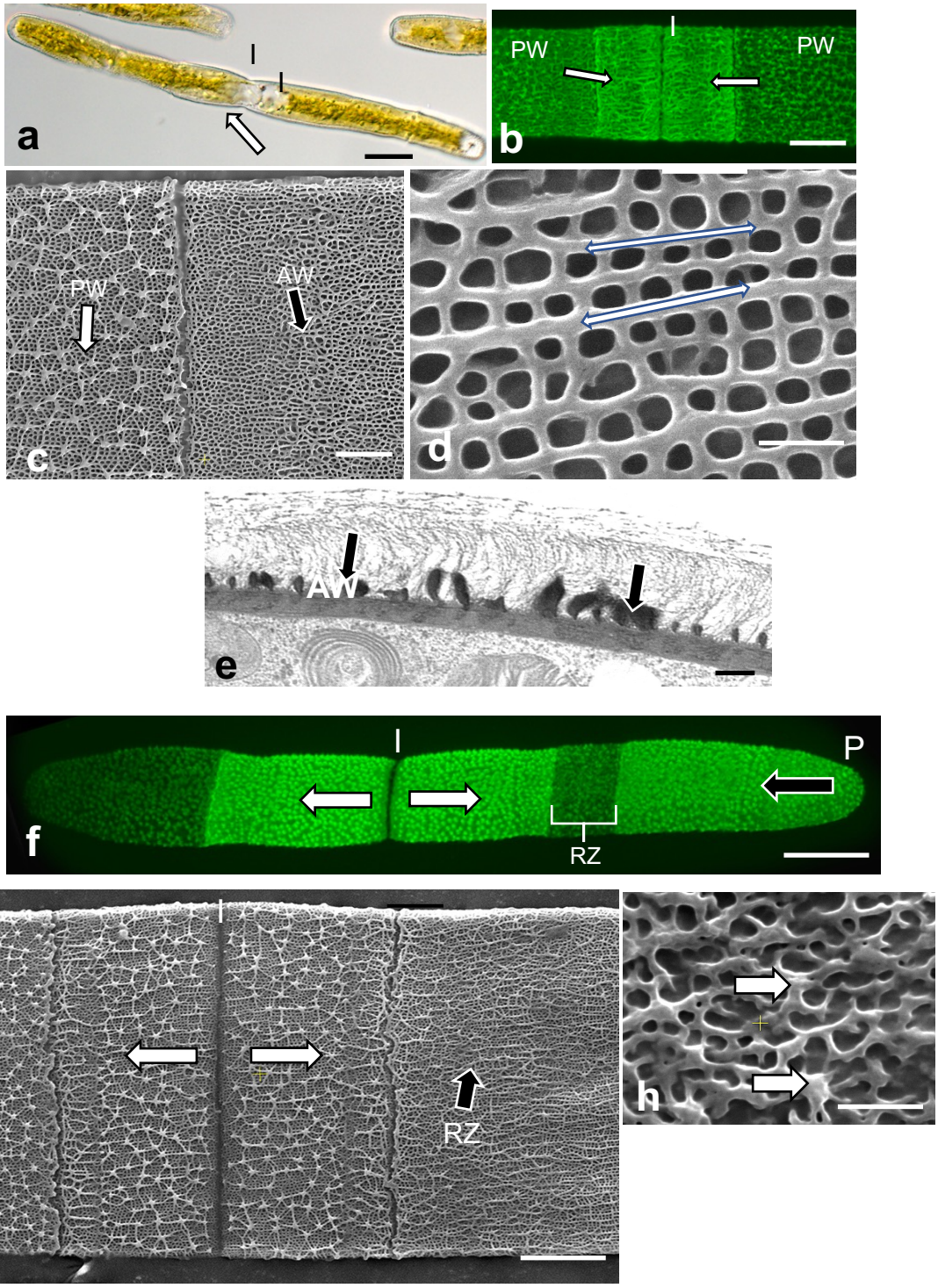
Online Resource 1 HG lattice alterations in treatments with 0.25 mM $CaNO_3$ (instead of $CaCl_2$) and co-treatment with 0.25 mM $CaCl_2$ and 0.25 mM $BaCl_2$ or $CaCl_2$ and KCl . a: Altered HG lattice (arrow) in cell treated for 48 h with $CaNO_3$. JIM5 labeling. CLSM image. Bar = 5 µm. b: FESEM image of altered lattice (arrow) in cell treated as in A. Note the irregular components on the CW surface (arrows). Bar = 200 nm. c: Altered HG lattice (arrow) in cell treated for 48 h with equimolar $CaCl_2$ and $BaCl_2$. JIM5 labeling reveals an altered lattice at the expansion zone of the isthmus (I). CLSM image. Bar = 7.5 µm. d: FESEM image of altered lattice in cell treated as in C. Note the irregular components on the CW surface (arrows). Bar = 200 nm. e: Altered HG lattice (arrow) in cell treated for 48 h with both $CaCl_2$ and KCl. JIM5 labeling reveals the altered lattice (arrow) at the isthmus (I). CLSM image. Bar = 7.5 µm. f: FESEM image of altered lattice in cell treated as in E. Note the irregular inner mesh-like components on the CW surface (arrows). Bar = 200 nm

Online Resource 2



Online Resource 2 Treatments with low $CaCl_2$ (0.025 mM (0.1X) $CaCl_2$ or 0.5 mM (0.2X) $CaCl_2$) and high $CaCl_2$ (2.5 mM (10X) $CaCl_2$). a: When treated for 48 h with 0.05 mM $CaCl_2$ subtle alterations (arrows) to the lattice are observed at the isthmus (I). CLSM image. Bar = 7.5 µm. b: JIM7 labeling of a cell treated with 0.05 mM $CaCl_2$ for 48h. The typical narrow band (arrow) is found at the isthmus (I). CLSM image. Bar = 15 µm. c: FESEM image of the altered lattice in a cell treated for 48 h with 0.05 mM $CaCl_2$. No projections are observed but elongate fibers often in parallel arrays form above the inner meshwork (arrows). Bar = 350 µm. d: JIM5 labeling of a cell treated with 0.025 mM $CaCl_2$ for 48 h. The HG lattice is notably altered (arrow) at the isthmus (I). CLSM image. Bar = 15 µm. e: JIM7 labeling of the more diffuse band (arrow) at the isthmus in a cell treated with 0.025 mM $CaCl_2$. CLSM image. Bar = 7.5 µm. f: FESEM image of the altered CW (AW) highlighting the HG components as irregular tufts (arrow). The cell was treated with 0.025 mM $CaCl_2$ for 48h. Bar = 400 nm. g: Magnified FESEM image of the tufts (arrow) found in a cell treated with 0.025 mM $CaCl_2$. Bar= 180 nm. h: JIM5 labeling of the notably altered HG components of the CW (arrow, AW) of a cell treated for 48 h with 2.5 mM $CaCl_2$ or 10x Ca^{2+}. CLSM image. Bar = 7.5 µm. i: JIM7 labeling of the diffuse band (arrow) at the isthmus of a cell treated with 2.5 mM $CaCl_2$. CLSM image. Bar = 15 µm. j: FESEM image showing the difference of the HG lattice of the pre-existing CW (PW) and the altered HG lattice (arrow) of the altered CW (AW) of a cell treated with 2.5 mM $CaCl_2$. Bar: 1.3 µm. k: Magnified FESEM image of the linear components (arrows) of the altered CW (AW) in a cell treated with 2.5 mM $CaCl_2$. Bar = 500 nm

Online Resource Fig. 3



Online Resource 3 Effects of calcimycin. a: Cell shape changes (arrow) and elongation after 48h treatment in 1 µM calcimycin. Bar = 15 µm. b: After 48 h treatment, JIM5 labels both the altered lattice (arrows) at the isthmus (I) and pre-existing lattice formed before treatment. (CLSM image) Bar= 5 µm. d: FESEM image of the altered lattice (AW, black arrow) in comparison to the lattice of the pre-existing CW (PW, white arrow). Bar = 2.5 µm nm. d: Magnified view of the altered lattice. Note that the "units" if the inner mesh are in linear arrays (double arrows). Bar = 180 nm. e: TEM image of the altered CW zone exhibiting the incomplete lattice (arrows). Bar = 0.5 mm. f: After 48 h recovery from a 48h treatment, JIM5 labels the newly regenerated lattice at the isthmus (I) produced in a bipolar mechanism (white arrows). A new lattice is regenerated at one pole (P, black arrow) by a unipolar mechanism. The altered CW is the repair zone (RZ, black arrow). CSM image. Bar = 10 µm. g: FESEM image of the bipolar synthesis (white arrows) at the isthmus (I) and the repair zone (RZ) in one semi-cell. Bar = 3µm. g: FESEM image of the repair zone after 48 h recovery. Mall projections (arrows) arise from the inner mesh. Bar= 400 nm.