

THEORETICAL AND EXPERIMENTAL SHG ANGULAR INTENSITY PATTERNS FROM HEALTHY AND PROTEOLYSED MUSCLES

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SUPPORTING MATERIAL

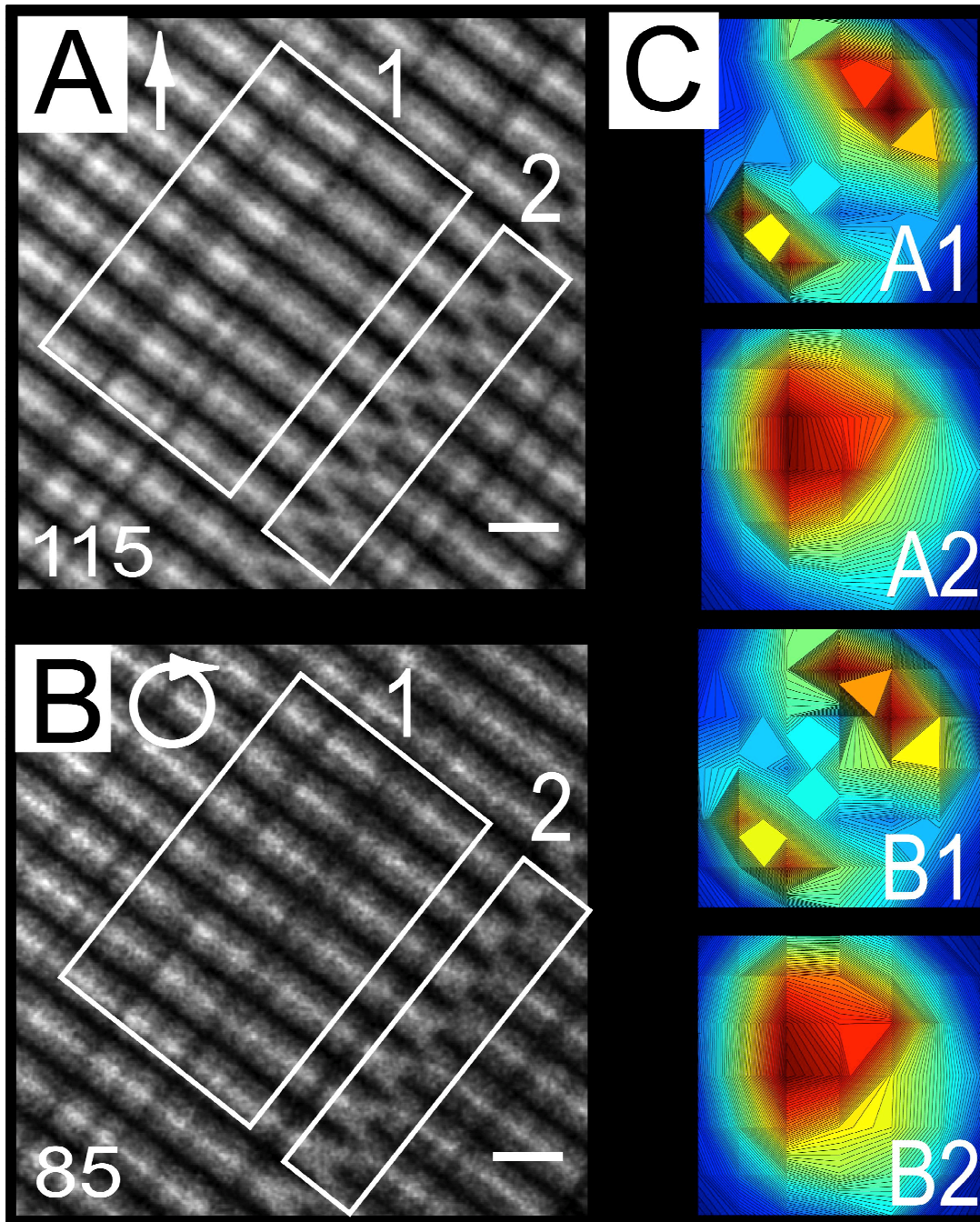


FIGURE S1. Polarization dependence of SHG-AIP. (A, B) SHG images from mild proteolysed xenopus muscle tissue for respectively (A) linear and (B) circular incident laser beam polarization. The measured average SHG intensity (mean gray pixel value) obtained from the entire image is indicated in each figure. (C) Corresponding SHG-AIPs of (A) and (B). Each thumbnail is labeled by a letter corresponding to the figure, either (A) or (B), followed by a number localizing the ROI in the figure. Note that ROIs 1 and 2 are duplicated in each figure. SHG-AIPs are in arbitrary units with increasing intensity from *blue* to *red*. Note also that SHG-AIPs are mainly determined by the myofibrillar organization but are not modified by the laser polarization. Full angular width of SHG-AIP in both x and y directions is 66° . Scale bar is $3 \mu\text{m}$.

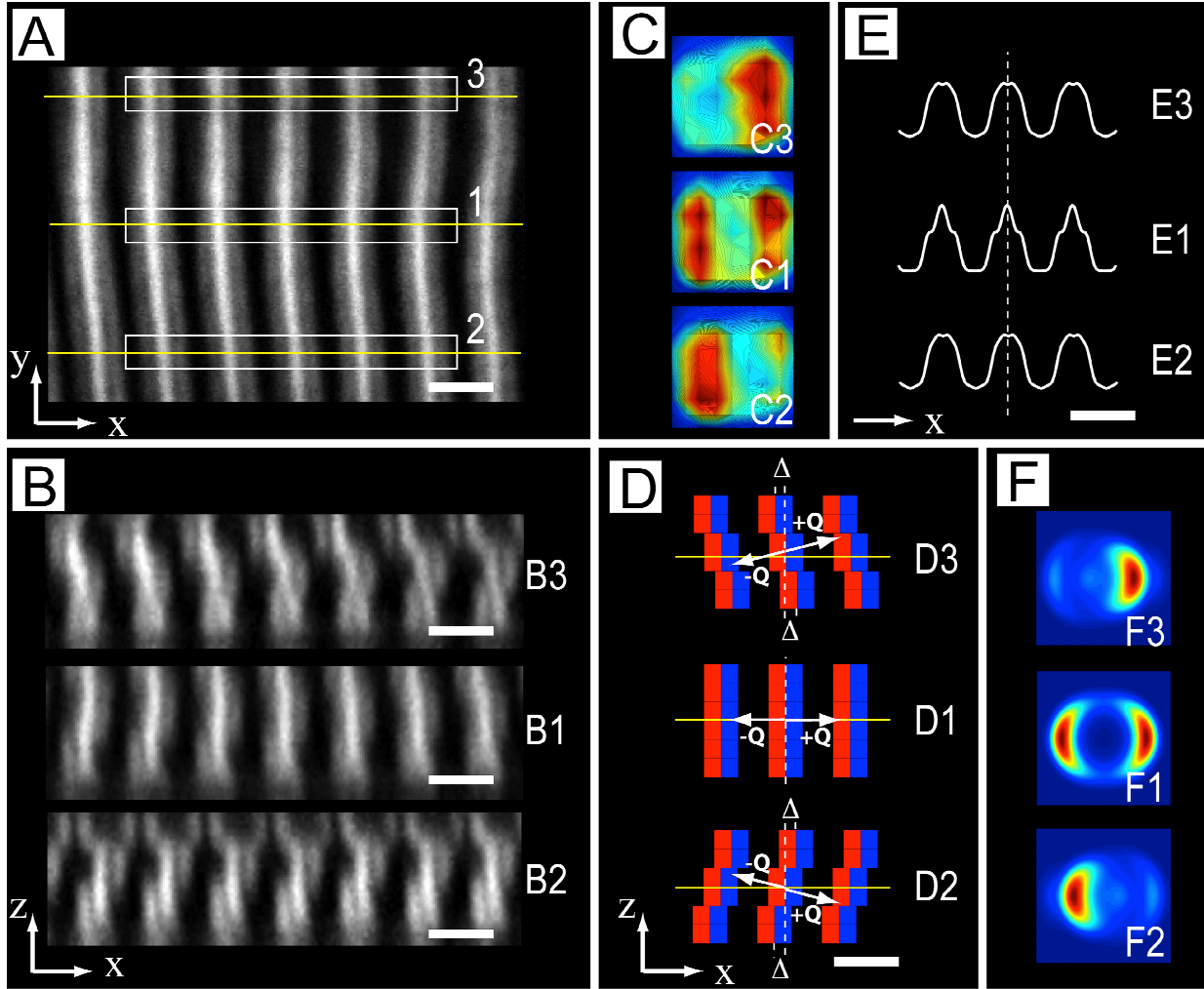


FIGURE S2. Relationship between myofibrillar organization and SHG-AIP of mild proteolysed xenopus muscle tissue. (A) xy section of SHG image localized at the middle of a z-stack. (B) Transversal xz section images of the z-stack mentioned in (A). Thumbnails B1, B2, B3 are obtained along the indicated yellow lines 1, 2, 3 of (A). Note that myofibrils are perfectly aligned (thumbnail B1) and misaligned in either x (thumbnail B2) or $-x$ (thumbnail B3) directions. (C) Experimental SHG-AIPs obtained from (A). Thumbnails C1, C2, C3 correspond respectively to SHG-AIPs obtained from ROIs 1, 2, 3 of (A). (D) Schematic diagrams of 6 xz juxtaposed myofibrils with different x-directed misalignments of amplitude Δ illustrating the myofibrillar misalignment of (B). Note that myofibrils are misaligned 2 by 2. Thumbnails D1, D2, D3, illustrate respectively perfectly registered, x and $-x$ directed myofibrils misalignment. Note that only three sarcomeres are shown for each myofibril and that A-bands are centered in each sarcomere. Polarity transition of myosin molecules in A-bands are indicated with a different *red* and *blue* color. For each diagram the corresponding modulation wave vector \mathbf{Q} , reflecting polarity inversion at the center of the sarcomere is shown. Note that the direction (clockwise, anticlockwise) of rotation of \mathbf{Q} in the xz plane depends on the direction ($+x$, $-x$) of myofibrillar misalignment along z direction. (E) Theoretical SHG intensity profiles corresponding to (D). Thumbnails E1, E2, E3 are obtained for a laser displacement over three sarcomeres for respectively diagrams D1, D2, D3. (F) Theoretical SHG-AIP corresponding to (D). Each thumbnail F1, F2, F3 represents an average SHG-AIP obtained from all positions of the laser beam over the three sarcomeres of each myofibril of respectively diagrams D1, D2, D3. SHG-AIPs are in arbitrary units with increasing intensity from *blue* to *red*. For all theoretical simulations, $l_y = l_z = 1 \mu\text{m}$, $l_x = 1.6 \mu\text{m}$, $L_x = 3 \mu\text{m}$, $L_y = L_z = 15 \mu\text{m}$ and $\Delta = 0.5 \mu\text{m}$. Full angular width of SHG-AIP in both x and y directions is 60° for (C) and 80° for (F). Scale bar is $3 \mu\text{m}$.