Supporting Information

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**Movie S1.** Time-lapse monitoring of glycan movement during mitosis. H2A-GFP transgenic zebrafish embryos were microinjected with GaINAz and allowed to develop to 10 hpf. The embryos were reacted with DIFO-647 (100 μM, 1 h) and imaged by confocal microscopy. Green, H2A-GFP; red, DIFO-647. A single z-plane fluorescence image was acquired every 20 s at early time points and every 1–5 min at later time points. A time stamp is shown in the top left corner of each frame (h:min:s). (Scale bar: 20 μm.)

**Movie S2.** Time-lapse monitoring of membrane and glycan movement during mitosis. H2A-GFP zebrafish were microinjected into the blastomere cell at the one-cell stage with GaINAz and mRNA for memCherry. Embryos were allowed to develop to 10 hpf, at which point they were reacted with DIFO-647 (100 μM, 1 h) and imaged by confocal microscopy. Blue, H2A-GFP; green, memCherry; red, DIFO-647. A single z-plane fluorescence image was acquired every 15 s, and a time stamp is shown in the top left corner of each movie frame (h:min:s). (Scale bar: 20 μm.)

**Movie S1 (mov)**

**Movie S2 (mov)**