

**Title:** Supplementary Movie 1

**Description:** An example of fusion events of 2  $\mu\text{M}$  AlexaFluor-488 -labeled HRS condensates in 20 mM HEPES, pH 7.2, 125 mM KAc, 1 mM MgAc buffer.

**Title:** Supplementary Movie 2

**Description:** An example of 2  $\mu\text{M}$  AlexaFluor-488 -labeled HRS condensates (cyan) spreading on SLB (not shown)

**Title:** Supplementary Movie 3

**Description:** An example of HRS recruitment on SLB membrane acquired with HS-AFM. The scale bar is 1  $\mu\text{m}$ . We note that the gain and force applied to AFM tip was increased during the experiment to minimize the parachuting effect.

**Title:** Supplementary Movie 4

**Description:** Fusion of GFP-HRS 221-777 condensates after overexpression in HeLa MZ cells. Yellow arrows indication droplets that undergo fusion. Time stamp is min:sec.

**Title:** Supplementary Movie 5

**Description:** An example of clathrin recruitment on HRS-rich SLB membrane acquired with HS-AFM. The scale bar is 500 nm.

**Title:** Supplementary Movie 6

**Description:** A PREM tilt of multilayered HRS-clathrin coats on SLBs. The reconstitution on SLB with 500 nM HRS and 200 nM clathrin.

**Title:** Supplementary Movie 7

A PREM tilt of two-dimensional HRS condensate on SLBs. The reconstitution on SLB with 1  $\mu\text{m}$  HRS.

**Title:** Supplementary Movie 8

**Description:** An example of 4xUb-VAMP2-sfGFP (cyan) clustering in GUV membrane containing 30% cholesterol. The sample was incubated 500 nM mScarlet-I3-HRS (magenta)

**Title:** Supplementary Movie 9

**Description:** An example of 4xUb-VAMP2-sfGFP (cyan) clustering in GUV membrane containing 0% cholesterol. The sample was incubated 500 nM mScarlet-I3-HRS (magenta)