

Descriptions of additional supplementary files

Supplementary Movie 1: Visualising chromocenters throughout the cell cycle, Related to Figure 1. Time lapse imaging of ESCs after doxycycline-induced expression of TALE-GFP against major satellite repeats (MSR). Images were acquired every 15 min over 72 time frames (18 hrs).

Supplementary Movie 2: Rapid movement of chromocenters, Related to Figure 1. Time lapse imaging (compiled five frames per second) of a representative ESC expressing doxycycline-induced TALE-MSRmClover. Images were acquired every 2 min for 60 frames (2h). Videos show cleavage and coalescence events with raw (a and c) or segmented (b and d) TALEMSR-mClover signal.

Supplementary Movie 3: Chromocenter dynamics, Related to Figure 1. Time-lapse imaging (compiled five frames per second) of an ESC cell expressing doxycycline-induced TALE-MSR-mClover, simultaneously showing the three coordinate axes (cross-sectional view) of chromocenter dynamics. Top-left panel: x-y; top-right panel: y-z and bottom-left panel: y-z. Images were acquired every 30 sec for 40 frames (20min).

Supplementary Movie 4: FRAP analysis of chromocenters, Related to Figure 1. Time lapse imaging (compiled five frames per second) of a representative ESC expressing doxycycline-induced TALE-MSRmClover and after GFP gapmer transfection. One chromocenter was photobleached and images acquired every second for 310 seconds.

Supplementary Movie 5: FRAP analysis after MSR RNA depletion, Related to Figure 2. Time lapse imaging (compiled five frames per second) of a representative ESC expressing doxycycline-induced TALE-MSRmClover and after MSR gapmer transfection. One chromocenter was photobleached and images acquired every second for 310 seconds.

Supplementary Movie 6: FRAP analysis of HP1 α at chromocenters, Related to Figure 2. Time lapse imaging (compiled five frames per second) of a representative ESC expressing mEos3.2-HP1 α and after GFP gapmer transfection.

Supplementary Movie 7: SIM 3D reconstruction of chromocenters, Related to Figure 3. Chromocenter 3D reconstructions acquired with structured illumination microscopy (SIM), showing details of H3K9me3 (green) and HP1 α (red) at chromocenters in ESCs that were transfected with a) GFP or b) MSR gapmers (scale bars, 2 μ m).

Supplementary Movie 8: MSR RNA foci, Related to Figure 4. 3D video showing the nuclear location of MSR RNA foci (red) and chromocenters (blue) and their 3D models computed from segmented 3D images.