**Supplemental Movie Legends:**

**Supplemental Movies 1-4 (accompanying Figure S5B):** Aged fibroblasts treated with rHAPLN1 were allowed to form matrices and extracted. Matrices were seeded with 1205lu melanoma cells overexpressing mCherry. Cells were allowed to adhere to the matrices and imaged on Nikon TE300 inverted microscope mounted on a humidified incubation chamber maintained at 37°C, 5% CO2. The experiments were performed with increasing doses of HAPLN1- 0ng (Supplemental Movie 1), 5ng (Supplemental Movie 2), 25ng (Supplemental Movie 3) and 100ng (Supplemental Movie 4). Images were acquired using 10x objective at 10 minute intervals. Movies were prepared at 7 frames per second over a duration of approximately 24 hours.

**Supplemental Movies 5-7 (accompanying Figure S5C):** Young fibroblasts with either empty vector control (Supplemental Movie 1) or 2 separate HAPLN1 shRNAs, sh\_0501 (Supplemental Movie 6) or sh\_3400 (Supplemental Movie 7) were allowed to form matrices and extracted. Matrices seeded with 1205lu melanoma cells overexpressing mCherry and imaged on Nikon TE300 inverted microscope mounted on a humidified incubation chamber maintained at 37°C, 5% CO2. Images were acquired using a 10x objective at 10 minute intervals. Movies were prepared at 7 frames per second and show a duration of approximately 24 hours.

**Supplemental Movies 8 and 9 (Accompanying Figure 5F):** Aged fibroblasts were layered in collagen supplemented with PBS or rHAPLN1 in a 35mm petridish, followed by layering of 1205lu melanoma cells overexpressing mCherry and allowed to set overnight. The following day, aged fibroblasts were mixed with T cells (labeled with Calcein AM) that are autologously matched to the 1205lu melanoma cells and layered over the collagen containing mCherry-labeled melanoma cells (Supplementary Movie 8). The experiment was also repeated in the presence of 25ng of rHAPLN1 (Supplementary Movie 9). Imaging was performed within 2-3 hours of setting the collagen plug and images were acquired every 20 minutes for a duration of approximately 24 hours on Leica TCS SP8 X WLL laser scanning spectral confocal microscope. Z-stacks were collected for each sample and displayed as x-z-y planes. Movies were prepared at 7 frames per second and show a duration of approximately 24 hours.

**Supplemental Movies 10 and 11 (Accompanying Figure 5G):** Young fibroblasts transfected with either empty vector controls (Supplemental Movie 10) or HAPLN1 sh\_RNA (Supplemental Movie 11) were layered in collagen, followed by layering of 1205lu melanoma cells overexpressing mCherry. The following day, young fibroblasts with either empty vector controls or HAPLN1 knockdown were mixed with T cells (labeled with Calcein AM) that are autologously matched to the 1205lu melanoma cells and layered over the melanoma/ fibroblast containing collagen. Imaging was performed within 2-3 hours of setting the collagen plug and images were acquired every 15 minutes for a duration of approximately 24 hours on Leica TCS SP8 X WLL laser scanning spectral confocal microscope. Z-stacks were collected for each sample and displayed as x-z-y planes. Movies were prepared at 7 frames per second and show a duration of approximately 24 hours.