

## **Descriptions of Additional Supplementary Files**

### **Supplementary Movie 1**

**Description:** Time-lapse series of minimum intensity projections through a 3-D collagen gel with embedded fresh (left video) and cryopreserved (right video) expanded NK cells and K562 target cells. Magenta circles indicate exemplary non-motile NK cells, blue circles indicate exemplary K562 target cells.

### **Supplementary Movie 2**

**Description:** Time-lapse series (total duration 30 min, recorded with a frame rate of 2/min) of maximum intensity projections through a 3-D collagen gel with embedded freshly expanded NK cells. The lower panel shows the output of the convolutional neural network used for automated cell tracking.

### **Supplementary Movie 3**

**Description:** Time-lapse series (total duration 15 h) of minimum intensity projections through a 3- D collagen gel with embedded fresh expanded NK cells and K562 target cells. The left video shows an enlarged field-of-view around a K562 target cell that is attacked and killed by NK cells approx. 10 h after the beginning of the measurement. The right video shows the output of a convolutional neural network which is used as a prescreening tool to automatically find killing events. Note that each killing event and killing time point is manually verified for subsequent analysis.