

## **Description of Additional Supplementary Files**

### **Supplementary Movie 1:**

Precocious centriole disengagement in interphase in DONSON-depleted cells

HeLa-GFP-centrin1 (green) cells were treated with siDONSON in the presence of 200 nM SiR-DNA (red).  $25 \times 1.2\text{-}\mu\text{m}$  z-stacks were acquired every 20 min at 40 $\times$  magnification. Image frames shown are maximum-intensity projections at each time point.

### **Supplementary Movie 2:**

A control mitotic cell showing proper bipolar formation and chromosome segregation

HeLa-GFP-centrin1 (green) cells were treated with siControl in the presence of 200 nM SiR-DNA (red).  $25 \times 1.2\text{-}\mu\text{m}$  z-stacks were acquired every 20 min at 40 $\times$  magnification. Image frames shown are maximum-intensity projections at each time point.

### **Supplementary Movie 3:**

Chromosome mis-alignment in DONSON-depleted cells

HeLa-GFP-centrin1 (green) cells were treated with siDONSON in the presence of 200 nM SiR-DNA (red).  $25 \times 1.2\text{-}\mu\text{m}$  z-stacks were acquired every 20 min at 40 $\times$  magnification. Image frames shown are maximum-intensity projections at each time point.

### **Supplementary Movie 4:**

Multi-polar spindle formation in DONSON-depleted cells

HeLa-GFP-centrin1 (green) cells were treated with siDONSON in the presence of 200 nM SiR-DNA (red).  $25 \times 1.2\text{-}\mu\text{m}$  z-stacks were acquired every 20 min at 40 $\times$  magnification. Image frames shown are maximum-intensity projections at each time point.