Supplementary information

**Movie S1**: A tilt series of medusavirus particles inside the host cell.

**Movie S2**: A tomogram slices of medusavirus particles inside the host cell.

**Movie S3**: A tilt series of medusavirus particles located outside the host cell.

**Movie S4**: A tomogram slices of medusavirus particles located outside the host cell.

**Movie S5**: A tilt series of cyst amoeba generated by cryo-fixation and freeze substitution. A medusavirus-like density is observed in mitochondria.

**Movie S6**: A tomogram slices of cyst amoeba generated by cryo-fixation and freeze substitution. A medusavirus-like density is observed in mitochondria.