

Description of Additional Supplementary files

File name: Supplementary Data 1

Description: Algorithm for simulated 0g used on the 3D clinostat

File name: Supplementary Data 2

Description: Algorithm for Rotational control used on the 3D clinostat

File name: Supplementary Data 3

Description: Data files used in figures and supplementary figures.

File name: Supplementary Video 1

Description: 3D clinostat set up in our tri-gas CO₂ and N₂ incubator. A specialized cell culture appropriate 3D clinostat (random positioning machine) was used to stimulate microgravity in culture conditions suitable for gamete and pre-implantation embryo culture. The 3D clinostat utilizes 2-axis that randomly reorientate the sample chamber to random positions at a constant speed to stimulate weightlessness.

File name: Supplementary Video 2

Description: Representative timelapse pre-implantation embryo growth following 4 h fertilization at stimulated microgravity in the mouse. Female mice were super ovulated and cumulus oocyte complexes recovered from the oviduct and placed at the end of the micro-channel slide. Mouse sperm was collected from the cauda epididymis and vas deferens and placed at the other end of the micro-channel slide. Sperm were required to traverse the micro-channel slide at either normal gravity or simulated microgravity to fertilise oocytes for 4 h. Following incubation all groups were cultured in the Embryoscope time lapse incubator for a further 96 h for assessment of embryo morphokinetics. Right/Middle Video = Normal gravity control; Left Video = Simulated microgravity.

File name: Supplementary Video 3

Description: Representative timelapse pre-implantation embryo growth following 24 h fertilisation and culture at stimulated microgravity in the mouse.

Female mice were super ovulated and cumulus oocyte complexes recovered from the oviduct and placed at the end of the micro-channel slide. Mouse sperm was collected from the cauda epididymis and vas deferens and placed at the other end of the micro-channel slide. Sperm were required to traverse the micro-channel slide at either normal gravity or simulated microgravity to fertilize oocytes for 24 h. Following incubation all groups were cultured in the Embryoscope time lapse incubator for a further 72 h for assessment of embryo morphokinetics. Right Video = Normal gravity control; Left Video = Simulated microgravity