

Supporting information

Table S1. Developmental results of the pilot study in v-shaped 96-well plates.

| Treatment | No. embryos | Cleavage | Blastocyst Day 7 | Blastocyst Day 8 |
|---------------|-------------|-------------|------------------|------------------|
| Control Group | 252 | 78.6 ± 2.6 | 19.8 ± 2.5 | 31.7 ± 2.9 |
| V-60 | 155 | 84.5 ± 2.9* | 21.3 ± 3.3 | 34.2 ± 3.8 |
| V-120 | 148 | 79.1 ± 3.3 | 20.9 ± 3.3 | 29.1 ± 3.7 |
| OV-30 | 160 | 73.1 ± 3.5 | 17.5 ± 3.0 | 28.1 ± 3.6 |
| OV-60 | 163 | 79.1 ± 3.2 | 21.5 ± 3.2 | 35.6 ± 3.8 |
| OV-120 | 143 | 69.9 ± 3.8* | 22.4 ± 3.5 | 34.3 ± 4.0 |

Cleavage, day 7 and day 8 blastocyst rates expressed as a percentage of presumed zygotes. * Significant differences ($P < 0.05$). Results are expressed as least square means ± standard error.

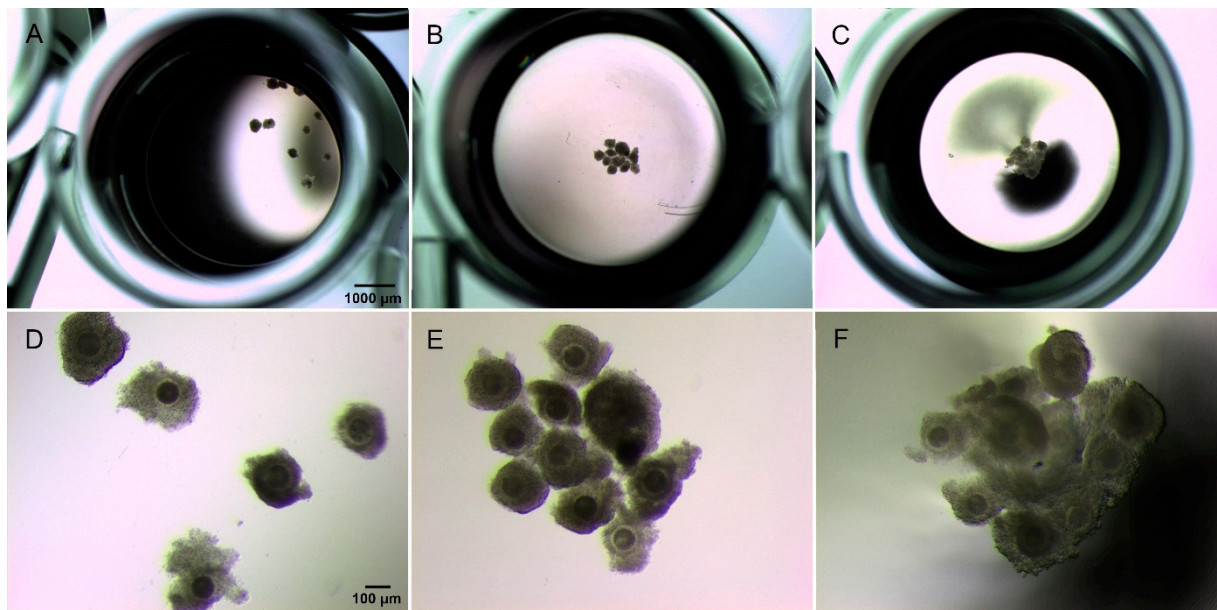


Figure S1. Organization of oocytes in three differentially shaped 96-well plates. The images show differences in interactions between immature cumulus-oocyte complexes when cultured in three surface geometries: flat (A, D), ultra-low attachment round-bottom (B, E), and v-shaped (C, F) 96-well plates.

Table S2. Summary of main results of the tested systems.

| | Treatment | MII (%) | Blastocyst Day 8 (%) | TCN | ICM/TCN | AC/TCN |
|--------|---------------|------------|----------------------|--------------------------|------------|-------------------------|
| Exp. 1 | Control Group | 87 ± 4.1 | 40.1 ± 4.6 | 117.8 ± 8.6 ^a | 30.9 ± 1.3 | 2.0 ± 0.5 ^a |
| | 2D Droplets | 84.9 ± 4.9 | 38.8 ± 4.2 | 82.3 ± 5.1 ^b | 32.6 ± 1.4 | 3.9 ± 0.5 ^b |
| | LM | 88.3 ± 4.1 | 26.1 ± 3.7 | 91.3 ± 5.1 ^b | 33.7 ± 1.3 | 3.5 ± 0.5 ^{ab} |
| Exp. 2 | Control Group | 86.8 ± 5.5 | 36.4 ± 2.4 | 134.6 ± 5.2 ^a | 38.6 ± 3.9 | 1.7 ± 0.3 |
| | F-60 | 84.9 ± 4.9 | 41.3 ± 2.8 | 112.4 ± 5.1 ^b | 34.5 ± 3.9 | 2.2 ± 0.3 |
| | V-60 | 90.2 ± 4.2 | 37.3 ± 2.5 | 112.2 ± 5.1 ^b | 39.4 ± 3.8 | 1.7 ± 0.3 |
| | R-60 | 91.1 ± 4.2 | 38.8 ± 2.5 | 97.6 ± 5.6 ^b | 41.9 ± 4.2 | 1.7 ± 0.3 |

Metaphase II (MII) ratio of oocytes analyzed with Hoechst staining. Day 8 blastocyst rates expressed as a percentage of presumed zygotes. Different superscripts per column (a and b) represent statistical differences ($P < 0.05$) among groups. Results are expressed as least square means ± standard error.

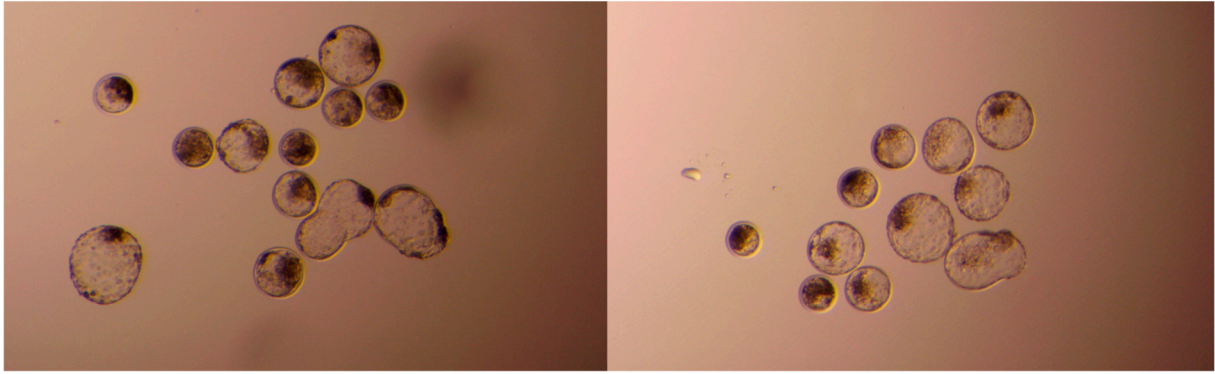


Figure S2. Representative images of bovine day 8 blastocysts.

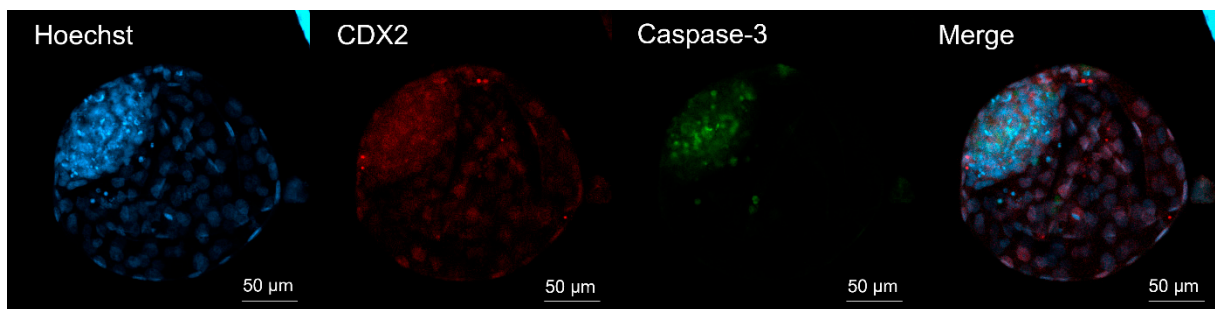


Figure S3. Differential apoptotic staining of day 8 blastocyst. Hoechst 33342 (blue fluorescence) was used to stain the nuclei of both trophoblast and inner cell mass cells; CDX2 (red fluorescence) was used to specifically stain trophoblast cells; and anti-caspase 3 (green fluorescence) was used to stain apoptotic cells.