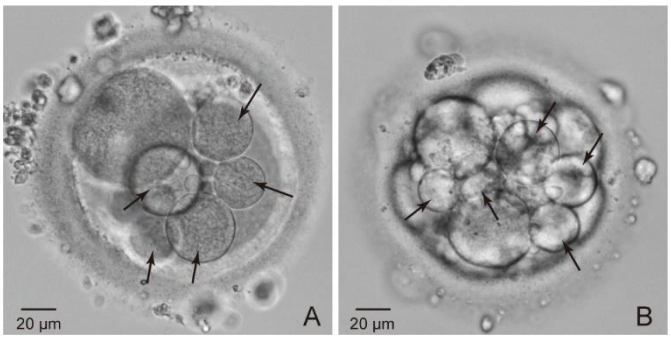
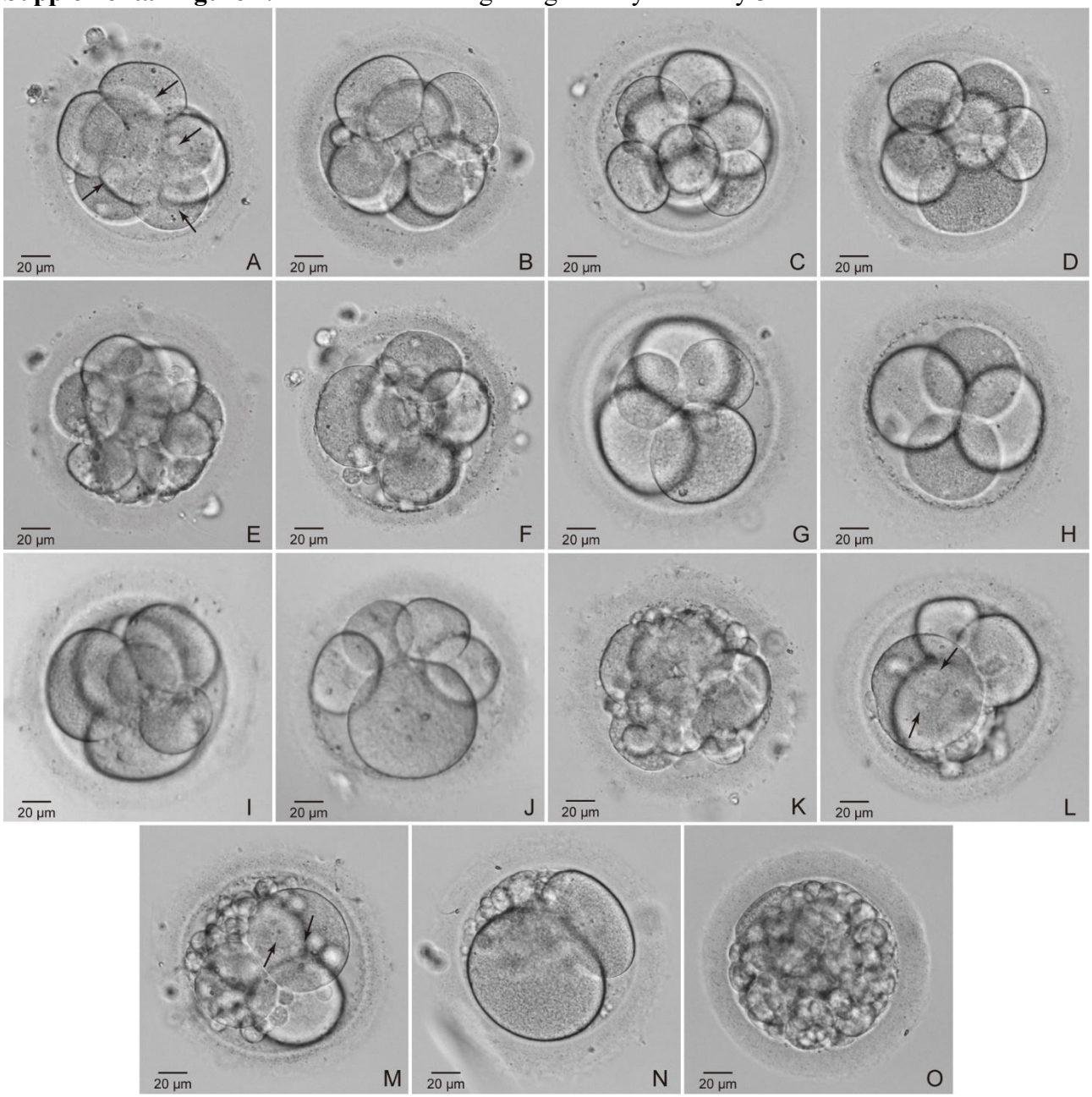
Supplemental Figure 1. Fragments in cleavage-stage embryos.



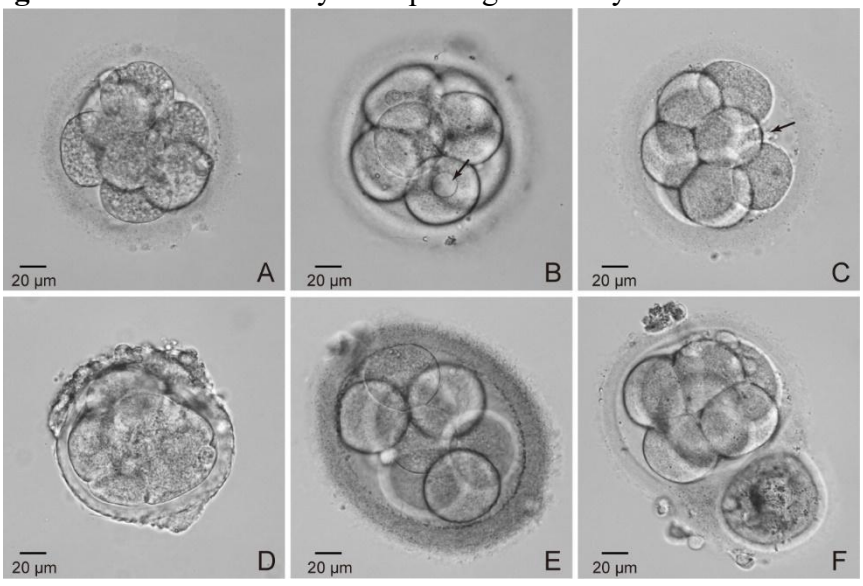
(A) An embryo on day 2. (B) An embryo on day 3. Arrows indicate larger fragments.

Supplemental Figure 2. Grade I–IV cleavage-stage embryos on day 3.



(A) A grade 8I embryo with good symmetry, no fragments, and a visible mononucleated nucleus in most blastomeres (arrows indicate mononuclear blastomeres). (B) A grade 8IIa embryo with 10%–15% fragments. (C) A grade 10IIa embryo. (D) A grade 7IIa embryo presenting a stage-specific cleavage pattern. (E) A grade 9IIb embryo with 15%–25% fragments. (F) A grade 7IIb embryo possessing a stage-specific cleavage pattern, with 15%–20% fragments. (G) A grade 5IIIa embryo possessing a stage-specific cleavage pattern. (H) A grade 4IIIa embryo possessing a stage-specific cleavage pattern. (I) A grade 6IIIb embryo. (J) A grade 5IIIb embryo. (I and J) The embryos possess non-stage-specific cleavage patterns. (K) A grade 8IIIb embryo, with relatively equal blastomeres and fragments >25%. (L) A grade 4IIIb embryo with non-stage-specific cleavage patterns (arrows indicate multinucleated nuclei of blastomeres). (M) A grade 4IIIb embryo with fragments >25% (arrows indicate multinucleated nuclei of blastomeres). (N) A developmental-arrested embryo graded IV. (O) A grade IV embryo with fragments >50%.

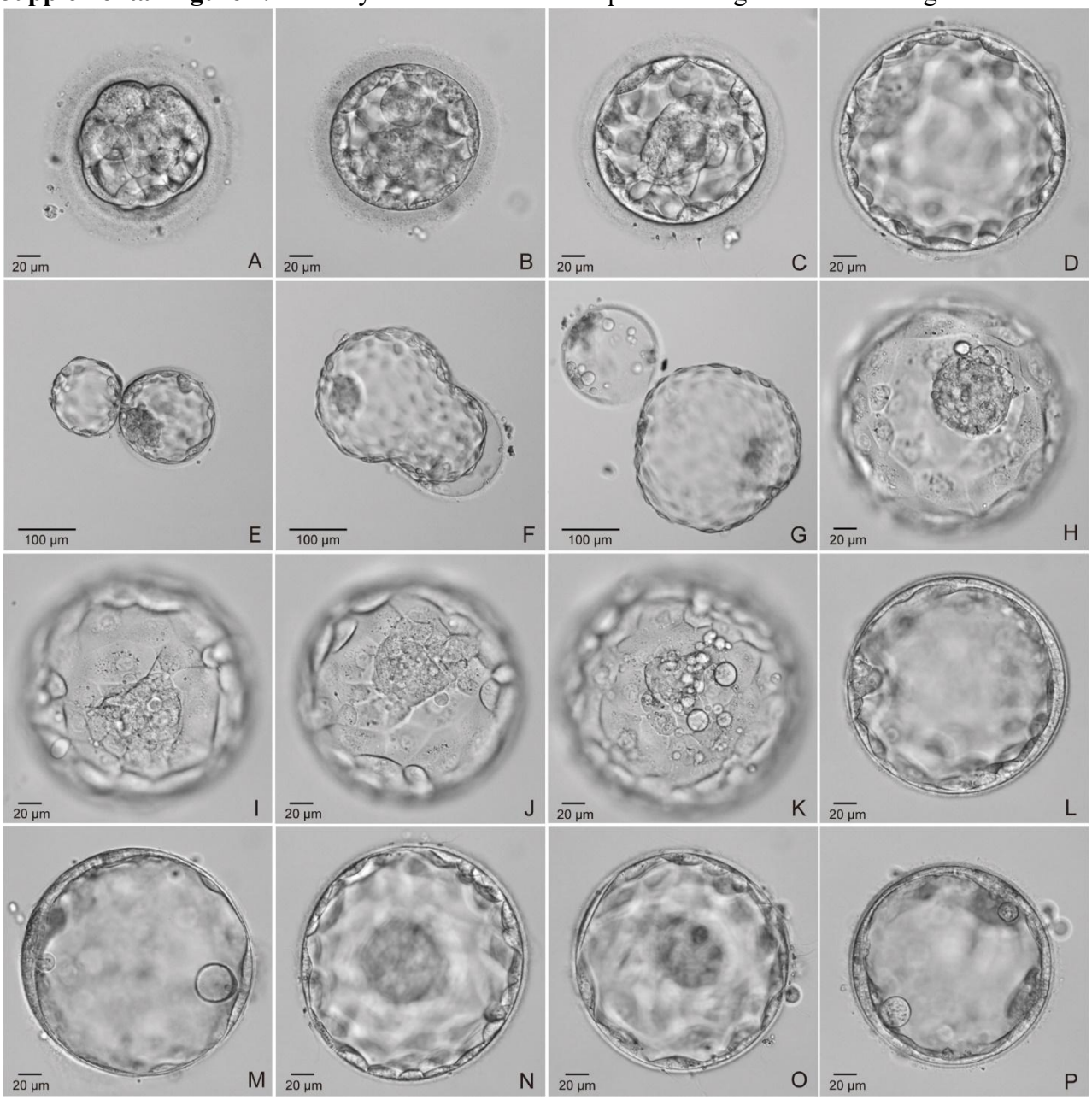
Supplemental Figure 3. Abnormal embryo morphologies on day 3.



(A) Pitting phenomenon (blastomeres exhibit increased cytoplasmic granularity and are covered with small concavities approximately 1.5 μm in diameter). (B) An arrow indicates cytoplasmic vacuoles >10 μm in diameter. (C) An arrow indicates a distinct gap between the two blastomeres. (D) The zona pellucida is condensed, bright, and agar-like. (E) The zona pellucida is darkened and

thickened, and the embryo is oval with insufficient intercellular junctions. (F) Conjoined embryos with connected zona pellucidas.

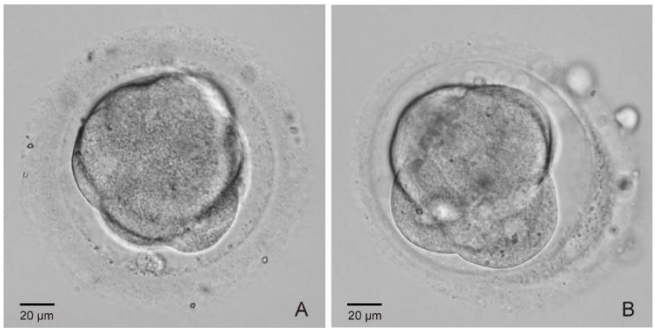
Supplemental Figure 4. Blastocysts at different developmental stages and different grades.



(A) A stage-1 blastocyst. (B) A stage-2 blastocyst. (C) A stage-3 blastocyst. (D) A stage-4 blastocyst. (E) A stage-5 blastocyst (with 8-shaped hatching). (F) A stage-5 blastocyst (with peanut-shaped hatching). (G) A stage-6 blastocyst. (H) A grade ICM-A blastocyst. (I–J) Two grade ICM-B blastocysts. (K–L) Two grade ICM-C blastocysts. (M) A grade ICM-D blastocyst. (N) A grade TE-A

blastocyst. (O) A grade TE-B blastocyst. (P) A grade TE-C blastocyst. ICM, inner cell mass; TE, trophectoderm.

Supplemental Figure 5. Early compaction embryos on day 3.



(A) A high-quality early compaction embryo (compaction occurred at the 10-cell stage) which eventually developed into a high-quality blastocyst. (B) A non-high-quality early compaction embryo (compaction occurred at the 5-cell stage) which did not develop into a usable blastocyst.