On-chip oocyte denudation from cumulus-oocyte complexes for assisted reproductive therapy

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Supporting Information

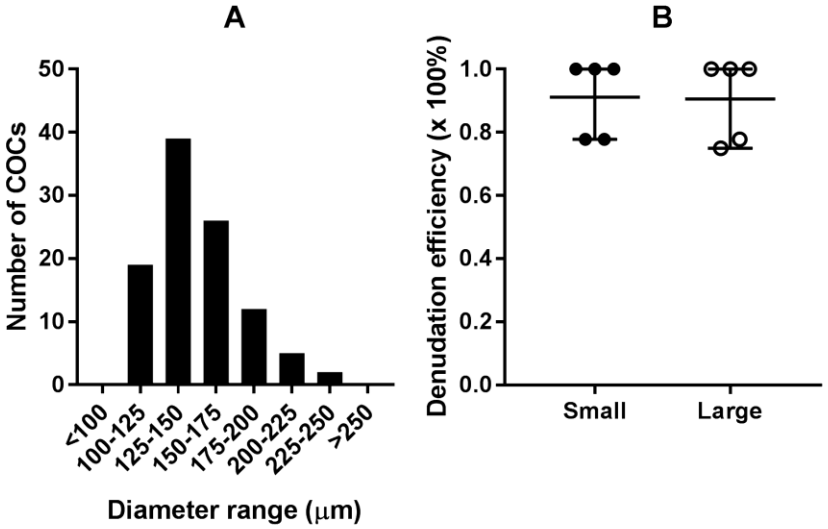

Figure S1. Count of COCs falling within different diameter ranges (A) and the effect of COC size on denudation efficiency (B). A total of 103 GV stage COCs from 11 mice were measured to generate the size distribution. In (B), the group of small COCs have an average diameter of 125 μm whereas those large COCs have an average diameter of 175 μm.

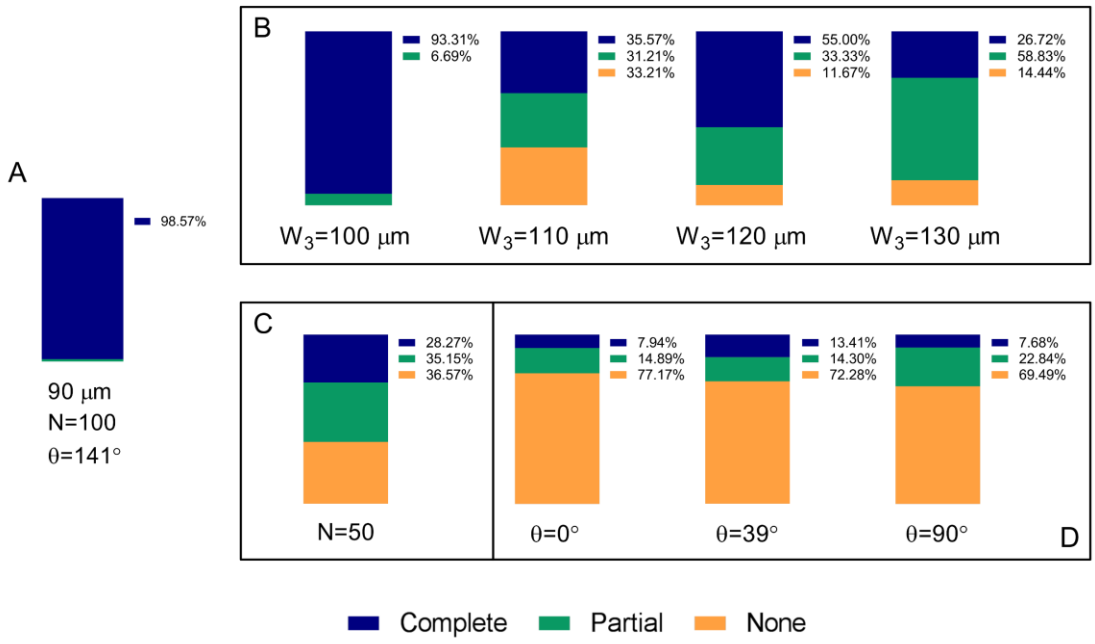

Figure S2. Breakdown of denudation outcome into three categories. Complete: oocytes are completely denuded; Partial: oocytes are partially denuded with only a portion of zona pellucida exposed; None: oocytes are fully enclosed within the corona radiate. (A) The optimal condition features W_3=90 μm, N=100 and θ=141º. (B) Effect of constriction width (W_3) on the denudation score. (C) Effect of repeating number (N). (D) Effect of teeth tilting angle (θ). The percentages are the mean of multiple replicates for each condition.

Table S1. Results of *in vitro* fertilization (IVF) on oocytes denuded on a chip or manually

Denudation method	Experiment No.	Number of oocytes inseminated	Number of two-cells (%[a])	Number of blastocysts (%[b])
On-chip	#1	42	24 (57.1)	24 (100)
	#2	59	48 (81.4)	46 (95.8)
	#3	61	50 (81.9)	47 (94)
	#4	40	19 (47.5)	18 (94.7)
	#5	65	43 (66.2)	41 (95.3)
	#6	59	46 (77.9)	45 (97.8)
Manual	#1	37	23 (62.2)	22 (95.7)
	#2	54	37 (68.5)	35 (94.6)

#3	52	27 (51.9)	23 (85.2)
#4	51	36 (70.6)	36 (100)
#5	71	30 (42.3)	25 (83.3)
#6	54	45 (83.3)	45 (100)

[a] Percent of survived oocytes developed to two-cell embryos
[b] Percent of two-cell embryos developed to blastocysts

Table S2. Results of intracytoplasmic sperm injection (ICSI) on oocytes denuded on a chip or manually

Denudation method	Experiment No.	Number of oocytes survived injection	Number of two-cells (%[a])	Number of blastocysts (%[b])
On-chip	#1	14	14 (100)	11 (78.6)
	#2	16	15 (93.8)	10 (66.7)
	#3	18	18 (100)	13 (72.2)
	#4	16	13 (81.3)	10 (76.9)
	#5	10	10 (100)	9 (90)
	#6	12	12 (100)	10 (83.3)
	#7	12	12 (100)	9 (75)
	#8	14	13 (92.9)	8 (61.5)
Manual	#1	7	6 (85.7)	5 (83.3)
	#2	13	13 (100)	10 (76.9)
	#3	11	11 (100)	8 (72.7)
	#4	10	8 (80)	7 (87.5)
	#5	6	4 (66.7)	2 (50)
	#6	11	9 (81.8)	7 (77.8)
	#7	14	13 (92.9)	12 (92.3)
	#8	11	11 (100)	8 (72.7)

[a] Percent of survived oocytes developed to two-cell embryos
[b] Percent of two-cell embryos developed to blastocysts