P-133 CORRELATION BETWEEN THE NUMBER OF CULTURED HUMAN EMBRYOS AND EMBRYO DEVELOPMENT IN THE WOW CULTURE DISH SYSTEM

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Objective

The well of the well (WOW) culture dish (LinKID™ culture dish; DNP, Japan) has 25 microwells that allows group culture under a single drop of medium. Through its design, it is possible to manage embryos separately whilst in group culture. Due to paracrine effects associated with group culture, embryo developmental rates have been reported to be improved in animal species such as the cow and mouse.

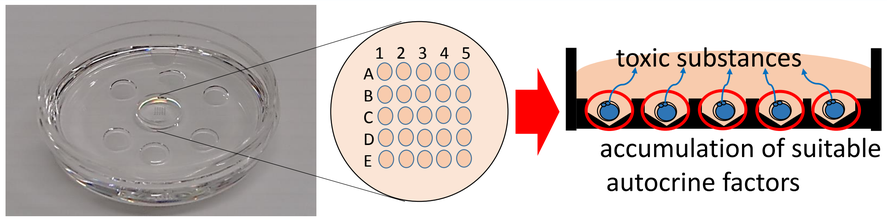

Figure1. Sectional view of the well of the WOW dish

However, there is scant information on group culture, and any subsequent effects of the WOW dish used for human embryo culture. Therefore, in order to clarify the group effect of WOW culture in human embryos, we investigated whether there is any relationship between the number of cultured embryos and subsequent embryo development.

Design

7039 embryos from 936 IVF cycles (from September 2014 to October 2015) in which blastocyst culture was performed by WOW dish or 15µl droplet were analyzed.

814 WOW cycles and 122 droplet cycles were each divided into 5 experimental groups according to number of cultured embryos (-5, 6-10,11-15,16-20 and 21-25 embryos)(Table1).

The rates of good quality embryos on culture day3 (7-9 blastomeres and fragmentation rate < 5% or blastomere compaction rate > 50%) and day5 (defined as ≥3BB, Gardner's score) were analyzed and compared between WOW and droplet groups.

Table 1. Details of 5 experimental groups in WOW and droplet culture

group	-5	6-10	11-15	16-20	21-25	total
No. of cycles (droplet)	41	63	10	5	3	122
No. of cycles (WOW)	217	457	81	37	22	814
Av. Age (droplet)	34.67	34.63	34.57	30.11	29.00	33.85
Av. Age (WOW)	34.47	33.83	33.20	32.85	32.36	33.58

Materials and Methods

2PN embryos which were obtained from either ICSI or conventional IVF were cultured in WOW (group culture with 60µl single step medium) or a droplet system (single embryo culture with 15µl single step medium) for up to 7 days. The culture medium was exchanged on day3 and day5 in the droplet groups, but not in the WOW groups.

Chi-square test was used for statistical analysis of embryo development.

Cochran-Armitage test was used for statistical analysis of correlation between the number of cultured embryos and embryo development.

Results

Bar charts show the rates of good quality embryos on day 3 and good quality blastocysts on day 5 in groups -5, 6-10,11-15,16-20 and 21-25 of WOW and droplet systems (figure 2,3).

The differences between WOW and droplet groups in the 21-25 embryos group were significant ($p<0.05$) for the two parameters on day3 and day5 respectively.

Furthermore, a positive correlation was observed between the number of cultured embryos and embryo development in WOW culture ($p<0.01$; the Cochran-Armitage Test), but not in droplet culture (Table 2, Figure 4).

Table 2. P-values of the Cochran – Armitage test between number of cultured embryos and embryo developmental rates in WOW and droplet culture

group	WOW	droplet
Day3 good quality embryo rate	**<0.01**	0.334
Day5 good quality blastocysts rate	**<0.01**	0.902

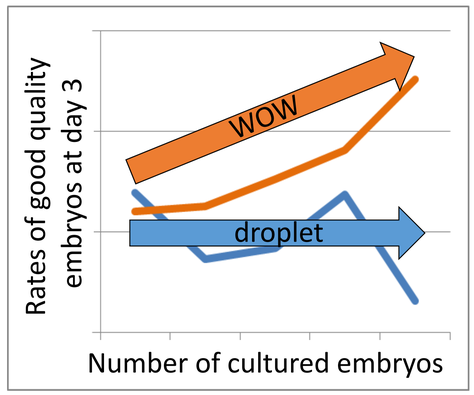

Figure 4. Schematic diagram of the correlation between the number of cultured embryos and rates of good quality embryos at day 3 in WOW and droplet culture

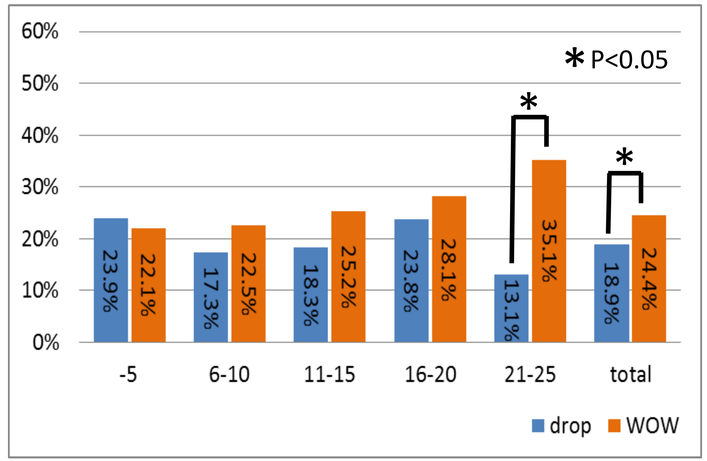

Figure2. Rates of good quality embryos at day 3

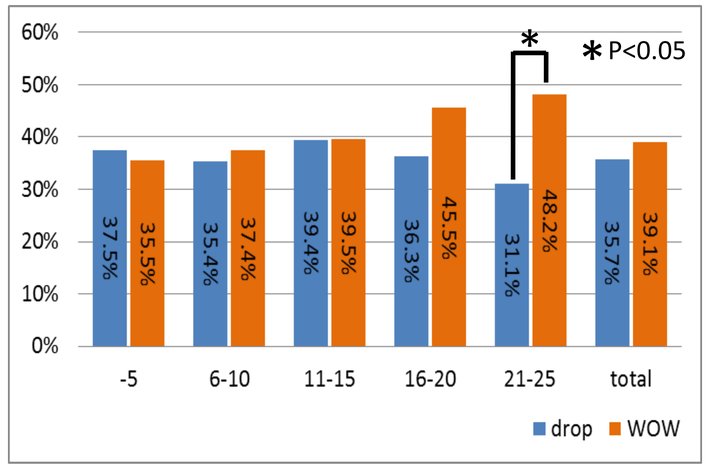

Figure3. Rates of good quality blastocysts at day 5

Conclusions

A positive correlation was confirmed between the number of cultured embryos and embryo development in WOW culture. In the WOW culture system, increasing the number of cultured embryos, potentially causes elevations in the concentration of paracrine factors. These findings in a human embryo culture system are in line with previous reports from animal species and support the positive role of group culture for human embryo development.