

# Dual Buffering Handling Medium is Better on Blastocyst Development

**Koray YILDIZ, Ugras UCAR, Aysin Akıncı BAK, Denizhan DENİZ,  
Recai PABUCCU**

**Doğu Fertil IVF Center, Malatya, Turkey**

## STUDY QUESTION:

Does dual buffering handling medium has superiority over single buffering handling medium on in vitro oocyte handling?

## WHAT IS ALREADY KNOWN:

Embryologists try to improve the quality of dividing embryo in vitro conditions. Appropriate culture conditions is needed for gametes and embryos to minimize stress of in vitro. Therefore a stable pH is crucial for oocytes which are lack of robust mechanisms especially without protective cumulus cells. A detailed review of pH and optimizing the culture environment in the IVF laboratory published before (1,2). The pH of culture conditions is so dynamic and can change so rapidly. These changes can be so damaging to gametes and embryos (3,4). Some laboratory procedures like oocyte pick-up, denuding oocytes or microinjection are so susceptible to pH fluctuations which can affect outcomes. Most IVF handling media utilize HEPES or MOPS to stabilize environmental pH as single-buffering systems. Use of dual buffering system containing HEPES and MOPS together may have beneficial effects over single systems.

## PARTICIPANTS:

We used as a dual buffering handling medium MHM (Irvine Scientific) and a single buffering medium QA with HEPES (CooperSurgical). Primary outcome measure was fertilization and ongoing pregnancy rates between the groups and also day 5 blastocyst development and cryopreservation rates was evaluated. Groups were comparable according to women age. Presence of fetal heart beats at 12 weeks of gestation assumed as ongoing pregnancy positive. Chi-square is the statistical test.  $P < 0.05$  is significant

According to our results there is no significant difference between fertilization rates and on going pregnancy rates in general groups. And also there isn't a significant difference in day 5 blastocyst formation groups according to fertilization and ongoing pregnancy rates. However day 5 blastocyst transfer rate is significantly increased with dual buffering handling media and cryopreservation of good quality surplus embryos increased significantly in dual buffering handling medium group (Table A).

## WIDER IMPLICATIONS :

This study demonstrates that dual buffering handling medium(MOPS+HEPES) has more stable pH as a result with better and more blastocyst development than single HEPES buffering medium. And though more embryos for cryopreservation which may be good for PGD on the way for getting a healthy baby and also for cumulative pregnancy rates.

## LIMITATIONS :

This study is compared HEPES+MOPS medium and HEPES only medium, therefore may not fully reflect the situation of MOPS only buffered medium.

## SUMMARY ANSWER:

Blastocyst development and cryopreservation of embryo rates are significantly higher in dual buffering medium. No differences in fertilization and on going pregnancy rates.

## MAIN RESULTS:

Table A	MHM (MOPS+HEPES) n=212	QA (HEPES) n=175	P Value
Fertilization rates in general	%69 (1090/1578)	%66.5 (833/1252)	0.15
On going pregnancy rates in general	%42.4 (90/212)	%39.4 (69/175)	0.54
Day 5 Blastocyst transfer rate	%52.8 (112/212)	%40.5(71/175)	0.016
Fertilization rates in day 5 Blastocyst group	%71.6 (802/1119)	%69.1(536/775)	0.2
On going pregnancy rates in day 5 blastocyst group	%55.3 (62/112)	%53.5 (38/71)	0.8
Cryopreservation rates of good quality surplus embryos in general	%50 (106/212)	%37.1 (65/175)	0.011

## REFERENCES

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3. Quinn P. Culture Systems: sequential. *Methods Mol Biol*, 2012; 912, 211-30.
4. Hentemann M, Mousavi K, Bertheussen K. Differential pH in embryo culture. *Fertil Steril*, 2011; 95, 1291-94.