SOUND VIBRATIONS CAN PROMOTE FERTILISATION AND EMBRYO DEVELOPMENT

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Introduction

Fertilised oocytes are cultured in CO_2 incubators that replicate the temperature, humidity and gas concentration of the uterus. Although there is a large number of important culture media components the real environment of embryo in the female reproductive tract is still not clear. In vivo, the embryo migrates from the fallopian tube to the uterus and is exposed to different vibrations by daily life movements of the female. We investigated if sound vibrations can improve embryo development in vitro. In this research the vibrations were transmitted from a computer directly to the Petri dish which was placed on the wireless speaker in a CO_2 incubator.

Materials and Methods

100 egg donors were included in the study. In total there were 1516 oocytes fertilised by ICSI: 758 oocytes from the group cultured with sound vibrations and 758 oocytes cultured without sound in another CO_2 incubator of the same model. Sound (techno music) was produced 24 hours a day by the wireless speaker in the range of frequency 20 – 20000Hz with the noise level up to 80 dB. Embryos were cultured individually in 15ul microdroplets of Global media for 6 days in a humidified incubator at 36.7° C with 7.3% CO_2.

All donors included in the research signed informed consent. Statistical differences between the values were made using analysis of variance.

Results

The results showed that fertilisation and blastocyst rates were significantly higher ($p<0.01$) in the group of embryos cultured with sound vibrations in compare with those cultured in silence (fertilisation rate: 84% vs 78% (fig.1), blastocyst rate: 48% vs 40% (fig.2) respectively).

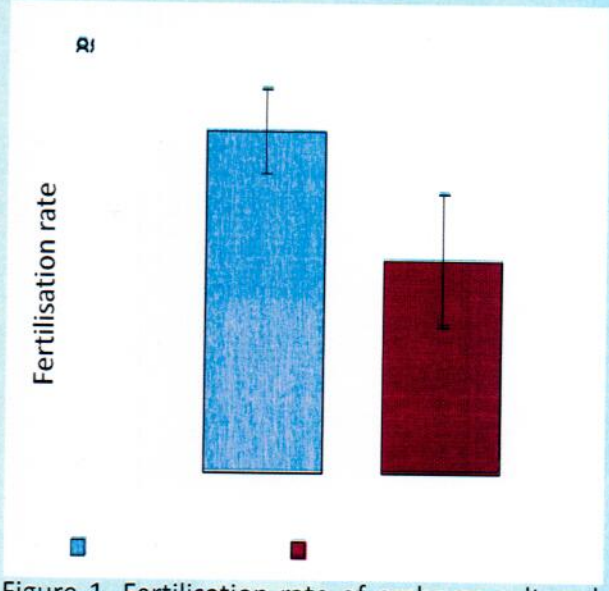

Figure 1. Fertilisation rate of embryos cultured with and without sound vibrations.

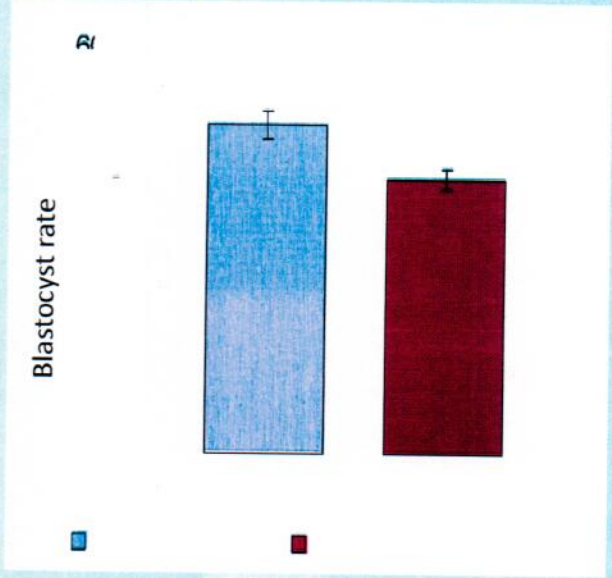

Figure 2. Blastocyst rate of embryos cultured with and without sound vibrations.

Conclusions

It was found that sound vibrations applied to the embryos have a positive influence on fertilisation and formation of blastocysts. Although the exact nature of this effect is still not clear, it is possible to assume that these vibrations equalise the concentrations of media compounds surrounding the embryo and promote embryo development.

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embryos had a shorter M-phase when compared to non-implanted embryos. However, further research is necessary to define the optimal time frame for the first M-phase.

137 Embryo morphokinetics: Correlation with maternal and paternal characteristics

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Aim: To analyse the effect of maternal age and body mass index (BMI) and paternal age on embryo morphokinetics

Methods: Retrospective data from an infertility unit from January 2014 to October 2015 assessing the following embryo morphokinetic timepoints: time of pronuclear appearance (tPNa) and disappearance (tPNf), time to reach two cells (t2), three cells (t3), four cells (t4), five cells (t5), six cells (t6), seven cells (t7), eight cells (t8), nine cells (t9), morula (tM), start of blastulation (tSB), blastocyst (tB), expanded blastocyst (tEB) and hatching of the blastocyst (tHB). IVF and ICSI embryos were analysed separately. Maternal age categories of 38-40, 41-42 and >42 years were compared with a reference standard 21-37 years. Maternal BMI categories of <19, 25-29.99, 30-34.99 kg/m2 were compared with reference standard 19-24.99 kg/m2. Paternal age categories were 21-40 and 41-60 years.

Results: A total of 1433 IVF embryos(336 cycles) and 1707 ICSI embryos(324 cycles) were analysed. IVF embryos with maternal age 38-40 years reached tB and tEB faster. ICSI embryos with maternal age 38-40 years reached t7 and t9 later. ICSI embryos with maternal age 41-42 years reached tPNa, t3, t4 and t6 later. Maternal BMI and paternal age analysis were restricted to the maternal age group 21-37 years to reduce confounding. IVF embryos with maternal BMI < 19 kg/m2 reached tPNa, tPNf, t2, t3 and t7 stages faster. IVF embryos with maternal BMI 25-29.9 kg/m2 reached t9 and tM later. IVF embryos with paternal age 41-60 years reached tPNf, t2, t4, t5, t6, t7, t8 and t9 faster

Conclusion: These results suggest that maternal age and BMI and paternal age can impact embryo morphokinetics. This data is from a single centre and further research is needed. While faster embryonic development is a good prognostic marker, fast early cleavage has been associated with epigenetic disturbances.

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138 Sound vibrations can promote fertilisation and embryo development

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Fertilised oocytes are cultured in CO2 incubators that replicate the temperature, humidity and gas concentration of the uterus. Although there is a large number of important culture media components the real environment of embryo in the female reproductive tract is still not clear. In vivo, the embryo migrates from the fallopian tube to the uterus and is exposed to different vibrations by daily life movements of the female. We investigated if sound vibrations can improve embryo development in vitro. In this research the vibrations were transmitted from a computer directly to the Petri dish which was placed on the wireless speaker in a CO2 incubator.

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139 Tight junction assembly mediated by CPEB2 is essential for mouse blastocyst formation

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Cytoplasmic polyadenylation element binding protein 2 (CPEB2) regulates cytoplasmic polyadenylation of mRNA in mouse haploid germ cells, but nothing is known about its expression and biological function during zygote embryo. Here, we show expression patterns of CPEB2 and its role in blastocyst formation. CPEBP2 is dramatically upregulated from the eight cell onwards. More interestingly, CPEB were detected in nuclei at the two-cell stage, but after the compaction the expression was not homogenous in the cytoplasm. To determine the biological role of CPEB2, we abolished transcripts of CPEB2 using siRNA and found that the transition rates between morula and blastocyst significantly decreased