NEONATAL PULMONARY RESEARCH

Mesenchymal Stem Cells from Umbilical Cord Wharton Jelly in term and preterm newborns – potential of neuroglial differentiation

Background

Mesenchymal Stem Cells from the Wharton Jelly (WJ-MSCs) of term births can be differentiated into oligodendroglial progenitor cells offering possibilities for neonatal brain repair. Since neonatal brain damage is mainly a problem in pre-terms, the differentiation potential of WJ-MSCs in this population is of particular interest.

Summary of results

WJ-MSCs from term (n=6; gestational age 38.5± 0.5weeks) and pre-term newborns (n=6; GA 31.8±2.8 weeks) were studied. The authors proofed the MSC-characteristic differentiation potential of the isolated cells. They were able to induce neuroglial transformation which was shown by the formation of cell clusters and elevated expression of genes which are characteristical for neuroglia. Both term and pre-term WJ-MSCs could be differentiated into neuroglia.

Strength

This is the first study comparing neuroglial differentiation potential of WJ-MSCs from term and preterm newborns. It supports the thesis that results from experiments with WJ-MSCs of term newborns could be transferred to preterms as well.

Limitations

The present study is an in-vitro study and the results are based on gene transcription and protein expression markers. Extensive animal research is needed to proof in-vivo effects before clinical application of WJ-MSCs for neonatal brain damage can be considered. Maternal and neonatal comorbidities which induced the preterm birth might have an effect on the WJ-MSCs and should be accounted for in future studies.

Practical conclusion

WJ-MSCs are potential therapeutic agents not only for neurological but also for pulmonary diseases in newborns. This study gives first hints that MSCs from term and pre-term newborns might have similar characteristics regarding neuroglial differentiation. The results should be verified for other differentiation pathways.

Messerli, M et al. Stem Cells From Umbilical Cord Wharton's Jelly From Preterm Birth Have Neuroglial Differentiation Potential. Reprod Sci, 1455-1464 (2013).

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