Introduction
In spina bifida the neural tube fails to close during the embryonic period and it is thought that exposure of the neural tube to the amniotic fluid during pregnancy causes additional neural damage (second hit hypothesis) [1]. Intra-uterine tissue engineering, using a biomaterial seeded with stem cells, might prevent this additional damage. For this purpose, autologous stem cells from the amniotic fluid is an attractive source. However, it is not known if amniotic fluid stem cells (AFSCs) from a fetus with a neural tube defect share the same characteristics as AFSCs from a healthy fetus. The aim of this study was to determine the wound healing effect of amniocytes derived from patients with a neural tube defect.

Materials and Methods
AFSCs from healthy fetuses (H) and fetuses with spina bifida (SB) were cultured with or without hypoxic conditions (20% versus 5% O₂). Conditioned medium (CM) from these cells was obtained. The synthesis of cytokines and growth factors by the amniocytes was determined by RT-PCR. Furthermore, the wound healing effect of CM was investigated by determining the ability of fibroblasts to proliferate and migrate.

Results
Fibroblasts play an important role in wound healing. Therefore we investigated the effect of factors produced by AFSCs on the proliferation and migration of dermal fibroblasts. Fibroblasts incubated with CM-SB showed significant higher proliferation compared to incubation with CM-H or unconditioned medium. Interestingly, ADFs show lower proliferation when incubated with CM obtained from both healthy and SB AFSCs grown under hypoxic conditions. Furthermore, CM-SB had a beneficial effect on the migration of dermal fibroblasts. RT-PCR showed a much higher expression of PDGF-β, IL-8 and EGF in amniocytes derived from a fetus with SB (Fig. 1). These growth factors are known to be involved in wound healing and could explain the beneficial effect on fibroblast proliferation and migration.

Discussion and Conclusions
Conditioned medium derived from AFSCs from fetuses with spina bifida, had a beneficial effect on fibroblast migration and proliferation in vitro. This suggests that autologous AFSCs can be used for intra-uterine tissue engineering to treat fetuses suffering from spina bifida.

References

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Disclosures
Authors have nothing to disclose.