Mussel-mimetic Sealant for Fetal Membrane Repair
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Introduction
Premature rupture of the fetal membranes is a devastating complication of pregnancy. Medical invasions into the intrauterine cavity for diagnostic or surgical interventions carry a significant risk for persisting membrane leakage and subsequent rupture - which seriously limits the developing field of fetal surgery. The effort goes to take action before membrane rupture rather than react after obvious or symptomatic rupture.

Materials and Methods
Our direction of research concerns preventive plugging of fetoscopic access sites in fetal membranes at the time of intervention to inhibit leakage and rupture. We introduce a novel biomechanical test device that permits to test closure of fetal membrane under close to physiological conditions. A new type of poly(ethylene glycol)-based hydrogel, mussel-mimetic tissue adhesive, showed efficient, non-disruptive, non-toxic bonding to fetal membranes in previous studies [1]. This mussel-mimetic tissue adhesive was used to seal membrane defects of up to 3.5mm. Biomechanical stretching tested the integrity of the sealant and its efficiency for possible in-vivo applications.

Results
Leak-proof repair that withstood membrane stretch in an ex vivo model were successfully accomplished using the synthetic hydrogel-type mussel-mimetic tissue adhesive.

Discussion and Conclusions
We present a new potential sealing modality for iatrogenic membrane defects that merits further evaluation in vivo.

References

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