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# Autologous human plasma in stem cell culture and cryopreservation in the creation of a tissue-engineered vascular graft

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**Aim:** We recently described the success of a tissue engineered vascular graft (TEVG) created with autologous adipose-derived stem cells (ASC) in an animal model. The aim of this study is to investigate the effect of replacing the fetal bovine serum (FBS) with autologous human plasma (HP) within the culture medium as well as the effect of cryopreservation on graft creation and differentiation of ASC.

**Methods:** Human ASCs and plasma, isolated from periumbilical fat and peripheral blood, respectively, were collected from the same donors. ASCs were differentiated in endothelial growth medium supplemented with FBS (2%) vs. HP (2%). Proliferation and endothelial differentiation was measured by growth curves, MTT assay, quantitative PCR, up-take acetylated LDL, and cord formation on Matrigel.

**Results:** ASCs expanded in HP-supplemented medium showed similar proliferation to FBS-cultured ASCs and consistent differentiation toward an EC lineage (increases in CD31, von Willebrand factor, and CD144 message; up-take Ac-LDL and formed tube formation on Matrige). ASC were seeded into vascular scaffolds and subjected to increasing shear force within bioreactor (0-9 dynes x5d) to evaluate their use in creating a TEVG. Cryopreservation did not significantly alter ASC viability, proliferation, acquisition of endothelial characteristics, or retention after seeding onto a vascular graft.

**Conclusions:** This study suggests that replacement of FBS with autologous HP-a step necessary for the translation of this technology into human use does not significantly impair proliferation or endothelial differentiation of ASCs used as EC substitutes and ASCs are tolerant to cryopreservation in terms of maintaining EC characteristics and retention on a vascular graft.

## Biography

Ping Zhang is currently working as Assistant Professor of Surgery in Cooper Medical School of Rowan University, USA. He has international experience includes various programs, contributions and participation in different countries for diverse fields of study.

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