goat bone marrow cells (GBMCs). These meshes were cultured either statically or under several dynamic culturing programmes for 7 and 14 days. Collected samples were characterized by DNA and alkaline phosphatase (ALP) quantification and scanning electronic microscopy (SEM). DNA quantification results showed a tendency for greater cellular proliferation under static and unidirectional perfusion conditions. ALP activity results revealed an enhanced cellular differentiation rate under cyclic flow direction inversion. SEM results also showed greater cellular adherence and spreading in cell-scaffold hybrid constructs cultured under those conditions. In conclusion, this culture system can be used for enhancing cellular proliferation and differentiation by optimizing the combination of fluid flow rate and flow inversion frequency during culturing periods.

Acknowledgments: European NoE EXPERTISSUES (NMP3-CT-2004-500283), STREP HIPPOCRATES (NMP3-CT-2003-505758) and FCT CellStrain (POCI/V.5/A0059/2005).

(P 11) A Novel Bioreactor Design for Enhanced Stem Cells Proliferation and Differentiation in Tissue Engineered Constructs

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Recent studies have shown that culturing undifferentiated stem cells in appropriate biochemical environments and under mechanical stimulation could provide the correct signals for cellular proliferation, differentiation and subsequent extracellular matrix production. This triggered a growing interest about *in vitro* biomechanically-stimulating culture environments.

The main goal of this work was to evaluate the efficacy of a newly developed bidirectional perfusion bioreactor. This apparatus enables implementing complex culturing programmes. Both perfusion flow rate and direction can be varied along the culturing period. This compact and user-friendly system is made of autoclavable materials enabling to culture up to 20 samples simultaneously. This study aimed at determining the most effective programmes for enhancement of cellular proliferation and differentiation. Fiber-bonded starch polycaprolactone (SPCL) meshes were statically seeded with