Introduction
With growing demand for lab-on-a-chip (LOC) systems in biomedical applications, the interest of industry in biocompatible materials increases. Due to their great potential of fabricating LOCs in a short period of time, cost-effective and in high resolution, 3D-printing technologies present a potential alternative to traditional manufacturing. However, there is a lack of information regarding the impact on cell behavior and biocompatibility of 3D-printing materials. Therefore, 3D-printed microfluidics manufactured using a 3D-printer (Projet 2500 Plus, 3D Systems) were post-processed in different ways and tested for cytotoxicity, impacts on metabolic capacity just as apoptosis of adipogenic mesenchymal stem cells (MSC).

Cytotoxicity effect of the 3D-printing material and influence on apoptosis
Since liquid and/or cells flow through LOC systems and come in direct contact with the material, potential negative leaching properties of the material need to be analyzed. The main components of the 3D-printing material used within this study are two acrylates: 3-hydroxy-2,2-Dimethylpropyl 3-hydroxy-2,2-Dimethylpropionat-Diacrylat and Diphenyl (2,4,6-Trimethyl-Benzylox)phosphinoxid. As the 3D-printing is melting above 70 °C and thus cannot be autoclaved, different post-processing procedures for cleaning and sterilization were developed and analyzed.

![Schematic post-processing procedure](image)

For sterilization, the 3D-printed parts were incubated in ethanol (70 % v/v) or sodium hypochlorite (2 % v/v). Preparation of extraction media and tests for biocompatibility were performed according to ISO-10993-12:2012 (see Fig. 1). The cytotoxicity effect and the influences on apoptosis were measured by an incubation in ethanol (70 % v/v, 1h) or sodium hypochlorite (2 % v/v). Preparation of extraction media 1, ethanol (70 % v/v, 1h, RT), sodium hypochlorite (2 % v/v, 1h, RT) and thus cannot be autoclaved, different post-processing procedures for cleaning and sterilization were developed and analyzed. The experiments demonstrate that a post-processing procedure with a sterilization in sodium hypochlorite (2 % v/v) is not suitable for cleaning the 3D-printing material.

![Determination of metabolic capacity](image)

To determine the metabolic capacity and cell viability, a CellTiter-Blue® cell viability assay (CTB) was used. Therefore, cells were cultivated in extraction medium 1 or 2 and compared to standard culture medium control. As shown in Fig. 3, the cell viability of MSC after cultivation in with extraction medium 1 does not differentiate from the control. In contrast, cultivation in extraction medium 2 had a negative impact on the metabolic capacity of the cells.

The experiments demonstrate that a post-processing procedure with a sterilization in sodium hypochlorite (2 % v/v) is not suitable for cleaning the 3D-printing material.

Outlook
In summary, after post-processing of the 3D-printed material with an incubation in ethanol (70 % v/v) there were neither significant influences on the cell viability and apoptosis of the MSC, nor a cytotoxic effect. Therefore, it can be assumed that no critical amount of cytotoxic compounds leached out of the analyzed 3D-printed material, the material has no negative impact on the cell behavior and is presumably biocompatible.