

# SURFACE MODIFICATIONS USED FOR INFLOW CANNULAS OF THE VENTRICULAR ASSIST DEVICES – STATE OF THE ART

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## Introduction

Nowadays, the Mechanical Circulatory Support (MCS) within the Ventricular Assist Devices (VAD) [1] appears to be a reliable and effective solution for patients with advanced heart failure (HF). After many years of work extracorporeal pulsatile VAD's are replaced by new generations of fully implanted continuous flow (CF) pumps. Clinical experience has shown that actual pump constructions still need to be improved to minimize the risk of complications during heart assistance.

## Materials and Methods

One of the complications is the inflow obstruction, caused by the ingrowth of tissue into the light flow, and pump thrombosis [2,3]. The main goal is to develop coating for external surface of the inflow cannula to provide controlled tissue ingrowth. The smooth surface of the cannula results in tissue overgrowth into the light flow and may be a source of emboli. The paper presents the inflow cannula's surface modifications performed by different VAD manufacturers within the topography characterization.

## Results and Discussion

The inflow cannulas used in CF VADs are mainly made of titanium alloy due to its mechanical properties and high biocompatibility. In general discussed surface coatings were characterized by roughness of about  $\approx Ra=15\mu m$ , high porosity  $\approx 82\%$  and well wettability  $\approx 60^\circ$ . The surface was covered with titanium microspheres or titanium mesh.

## Conclusions

The developed surfaces and clinical experience confirm the possibility to control the tissue ingrowth of the external surfaces of the inflow cannula on the tissue-implant interface.

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## References

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