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Arteriogenesis

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Cardiovascular occlusive diseases, such as myocardial infarction or stroke, are still the major cause of morbidity and mortality worldwide and are, particularly during the SARS-CoV-2 pandemic, drastically increasing. Arteriogenesis, which describes the process of natural arterial bypass growth, is a tissue- and life-saving process, which is given to us by mother nature to compensate for the function of a stenosed coronary or peripheral artery non-invasively. Since our first investigations on the mechanisms of collateral artery growth, more than 20 years ago, a lot of progress has been made, which we aim to make accessible in the current book. We present the available animal models and share information on the used state of the art techniques. We describe how fluid shear stress, the trigger for arteriogenesis, is translated into biochemical signal transduction cascades, and we also highlight the functional role of extracellular RNA and I110. We address the problematic features of arteriogenesis in patients suffering from diabetes mellitus, and provide an overview of currently available or potentially therapeutic approaches to promote arteriogenesis in patients. We focus on the combination of ultrasound and microbubbles, the permanent occlusion of the internal mammary arteries, and simple exercise training. We believe that we have come much closer to achieving our goal of understanding the mechanisms of arteriogenesis, enabling clinicians to promote collateral artery growth in patients and cure vascular occlusive diseases.

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