Stem cells have been identified in many tissues building adult organism. These cells are responsible for the tissue renewal and regeneration. The ones which reside within the skeletal muscles, so called satellite cells (SCs), are localized between muscle fibers and basal lamina, i.e. extracellular protein network. Under physiological conditions these cells remain quiescent what means they are not dividing. Upon injury satellite cells become activated and turn into rapidly dividing myoblasts. Next, myoblasts fuse with each other and form multinucleated myotubes. Finally, growing myotubes are forming muscle fibers with functional protein apparatus responsible for muscle contraction. Unfortunately, with aging or disease, such as muscular dystrophies (e.g. Duchenne dystrophy, DMD), SC pool might be exhausted what could result in the muscle failure and might be fatal. For this reason, various strategies to support skeletal muscle repair are considered. Among them are cell-based therapies involving myoblasts, which could be transplanted to support regenerating tissue. Unfortunately, myoblasts are characterized by the limited ability to colonize, divide, and survive within the regenerating muscle. It is known that satellite cells, although necessary, are not the only cells contributing in muscle tissue reconstruction. Within skeletal muscles reside many different cell types which may directly or indirectly contribute in that process. Among them are for example fibro-adipogenic progenitors and fibroblasts responsible for scar formation or pericytes responsible for support of blood vessels. However, exact characteristics and role of these different cell types during regeneration of muscle tissue remains unclear. In this project I will analyze the role of cells which have CD146 protein on their surface (CD146+ cells). CD146 have been previously used as a protein marker typical for population of cells associated with blood vessels similar to pericytes and present in human skeletal muscles. My preliminary results suggest that similar population is present also in mouse skeletal muscles. Moreover, these cells seem to have myogenic properties i.e. they are able to turn into myoblasts and fuse with each other to form multinucleated myotubes when cultured *in vitro.* In this new project I plan to analyze the developmental origin of CD146+ cells, their characteristics and evaluate their role during regeneration of adult skeletal muscles. Finally, after proper characterization of analyzed cell population, I will engraft CD146+ cells into damaged mouse muscles to verify their therapeutic potential. My study will involve variety of cellular, protein histological and immunostaining techniques altogether allowing to check cells localization as well as characteristic, tissue structure, functionality of skeletal muscles subjected to the transplantation of CD146+ cells. My working hypothesis states that CD146+ cells are taking part in skeletal muscle formation during development and are present in adult skeletal muscles as cells associated with blood vessels which contribute to skeletal muscle regeneration process. Finally, I hypothesize that CD146+ cells will support skeletal muscle regeneration after their engraftment into dystrophic. If regeneration will be improved using my experimental protocols, they could be used in the future to treat injured or dystrophic skeletal muscles, which lost their regenerative ability, and to support their healing and regaining of functionality.