2. Μη τεχνική περίληψη του έργου

The skeletal muscle is a highly complex and heterogenous tissue serving a multitude of functions in the organism [1]. Muscular dystrophies, on the other hand, are a group of genetically inherited disorders that primarily affect the muscle. Among the most commonly occurring dystrophies are the Duchenne muscular dystrophy (DMD) and Myotonic Dystrophy type 1 (DM1) [18, 19].

Here we shall attempt to investigate and identify the cellular and molecular mechanisms that take place during both, normal muscle development as well as in myogenic diseases, such as muscular dystrophies. The experiments suggested in the following sections have already been performed in *in vitro* cell culture models of the skeletal muscle. Repeating them on animal models is necessary to confirm the observed results and conclusions. Mice are selected as the most appropriate model for this investigation due to their similarity with humans, at all three levels: genetics, anatomy and physiology [26]. Animal experiments can be categorised in *ex vivo* experiments and, *in vivo* experiments.

A. **Ex vivo experiments:** the extensor digitorus longus (EDL) muscle, located in the limbs of the mice, will be isolated after sacrificing them. Muscle fibres will be then cultured separately and perform the relevant molecular experiments: RNA and protein level [20].

B. **In vivo experiments:** animals will be administered either locally or systemically the molecule under investigation post anesthesia. At specific time points the animals will be sacrificed with the most appropriate way and then again, harvest the muscle or other related organs for the relevant molecular level experiments, such as RNA and protein [21, 27].

Our ultimate goal is to develop new therapeutic approaches to repair the skeletal muscle after injury and most importantly, to identify efficient methodologies to correct the underlying genetic defects and induce regeneration and muscular reconstruction in muscular dystrophies.

3. Συνάφεια και αιτιολόγηση των:

α) χρήσης ζώων, συμπεριλαμβανομένης της καταγωγής, του εκτιμώμενου αριθμού, των ειδών και των σταδίων της ζωής τους.