Tardigrades (known also as water bears), discovered in 1773, are a phylum of small invertebrates. They can be found all over the Earth and can inhabit very diverse environments (from the deepest oceans to mountain tops). Tardigrades are known to survive under extreme conditions like low temperature and high pressure, and most interestingly the lack of water. The last capability is termed anhydrobiosis and is a form of cryptobiosis, induced by dehydration, and resulting in significant decrease in metabolic activity. In the case of tardigrades, it is described as a "tun" shape structure formation due to dehydration. After tun rehydration, these animals come back to active life. Interestingly, above 20 years ago the "Sleeping Beauty" hypotheses was proposed to explain the effect of anhydrobiosis on tardigrade aging and according to this hypotheses tardigrades do not age during the anhydrobiosis process but the prediction of this hypothesis is rarely tested.

Tardigrades do not possess specialized respiratory and circulatory systems and distribution of nutrients from the gut is achieved by free-floating coelomocytes often called as "storage cells". These cells are distributed throughout the tardigrade body and their number and size may vary between species and individuals of the same species. The storage cells are important for many physiological functions as they are presumed to store and release energy in the form of glycogen and lipids, the latter being known as the most "energetic" compounds. In anhydrobiosis process, lipids may be essential as a source of energy for the tun formation, the tun stage persistence and revival. Moreover, it is also known that lipid metabolism potently regulates aging and lifespan. Studies related to role of storage cell lipids in process of anhydrobiosis are very limited as well as the role of lipids in storage cell physiology and in tardigrade aging are rarely tested.

On the other hand, lipid fatty acid compositions of anhydrobiotic animals might also play important role in resistance against many environmental stressors. In tardigrades, changes in fatty acid compositions of lipids are observed under extreme conditions such as dehydration or space flight conditions but how the modification in fatty acid composition of storage cell lipids impact tardigrade aging has never been tested. Accordingly, preliminary results obtained for the tardigrade *Paramacrobiotus experimentalis* at the Department of Bioenergetics (AMU) suggested that age and sex of the animals can potentially influence the ability of tardigrades to survive under extreme conditions. Moreover, our results also reveal the differences in the storage cell lipid amounts in active females of different age.

Therefore, the aim of the proposal is to estimate the storage cell lipid amount and their fatty acid composition for *Pam. experimentalis* males and females of different ages in the absence and presence of anhydrobiosis. In order to achieve that, age and sex specific specimens will be divided into two subgroups; control and experimental. Specimens in control subgroups will remain hydrated while anhydrobiosis will be induced to specimens belongs to experimental subgroup. After each episode, a part of alive and dead specimens from both experimental and control subgroup will be collected and divided to perform further analysis i.e., detection and qualification of storage cell lipids and estimation of their fatty acid composition of storage cell lipids.

The obtained results may provide important data concerning the role of storage cell lipid amount and composition in tardigrade aging as well as it may contribute to validation of "Sleeping Beauty" hypotheses.