2. Song, S., Miller, K.D., Abbott, L.F. Competitive Hebbian learning through spike-timing-dependent synaptic plasticity. // Nat. Neurosci. – 2000. – Vol. 9. – P. 919–926.

TROUT ERYTHROCYTE AS CELLULAR MODEL TO STUDY POLLUTANT TOXICITY

Falcioni G.

School of Pharmacy and Health Product, University of Camerino, Camerino, Italy

Erythrocytes are a routinely used model to study the toxicity of new chemicals, in particular fish erythrocytes are useful simple models because they possess nuclei, mitochondria and other organelles typical of somatic cells. These cells are not thus simple contain hemoglobin but they are also able to maintain complex cellular processes, including protein synthesis and oxidative metabolism.

Contrary to mammals and birds, a multiplicity of hemoglobin components is present in fish erythrocytes. This multiplicity may be related to the fact that hemoglobins have to provide oxygen for different purposes, namely the metabolic demands and the operation of the swim bladder.

In the case of erythrocytes from *Salmo irideus trout,* there are four different hemoglobin components characterized by functional differences which have been correlated to a different physiological role. These hemoglobins are prone to oxidation, either as purified proteins or in the whole cell. This property permits, similarly to what occurs in subjects with unstable hemoglobin, to follow the autoxidation process over a relatively short time and to investigate the relationship between met-Hb formation and impairment of cellular structures in erythrocytes.

It is well to point out that hemoglobin auto-oxidation results in the liberation of superoxide anion, and thereby of products such as H_2O_2 or hydroxyl radicals, which can be derived from superoxide anion itself. Also it is possible to induce a condition of endogenous oxidative stress by promoting mitochondrial membrane depolarization and thus a decreased mitochondrial functionality. Thus these processes are of particular interest for studying the oxidative damage on different cellular compartments (cell membrane, nucleus etc.).

Met-Hb formation may be used as an early marker of oxidative status of erythrocytes and this parameter could provide a useful and rapid index to monitor both, pollutant toxicity and the efficacy of an eventual antioxidant treatment. In fact, an improvement in RBC redox status should delay the extent of met-Hb formation.

The nucleated trout erythrocyte represents also a stimulating cellular model to study oxidative damage associated with senescence processes. It is known that there is a correlation between the density of erythrocyte subpopulation and ageing.

Keeping in account the upon described characteristics we used trout erythrocytes (and their subpopulations) to study physiological processes and the interaction of important environmental contaminants. Several papers on this field have been published in international journals by our research group in the past years.

Hence, the nucleated trout erythrocyte represents a stimulating cellular model to study pollutant toxicity. In addition, this model permits to determine *in vitro* the antioxidant efficacy of natural or synthetic compounds and hence to attenuate oxygen radical-induced damage.

ВИЗУАЛИЗАЦИЯ КОМПЛЕКСОВ ОДНОСТЕННЫХ УГЛЕРОДНЫХ НАНОТРУБОК С ДНК В КЛЕТКАХ МЕТОДОМ СПЕКТРОСКОПИИ КОМБИНАЦИОННОГО РАССЕЯНИЯ

Васильев Н.В.[1], Шуба М.В.[2], Голубева Е.Н.[1], Кулагова Т.А.[1], Черенкевич С.Н.[1]

[1]*Белорусский государственный университет, Минск, Беларусь*
[2]*Научно-исследовательское учреждение "Институт ядерных проблем" Белорусского государственного университета, Минск, Беларусь*

Углеродные нанотрубки (УНТ), проявляющие уникальные физико-химические свойства, являются перспективными объектами для решения ряда задач в биологии и медицине [1]. Показано, что УНТ могут быть использованы в качестве каркасного материала в инженерии клеточных тканей, для создания биосенсоров, для адресной доставки биологически-активных веществ и визуализации клеток и субклеточных структур [2]. При использовании УНТ необходимо знать динамику проникновения, распределения и деградации УНТ в клетках. Это позволит выявить механизмы