esses. Interestingly, in addition to acute neuronal injury, disturbances of zinc metabolism has also been demonstrated to play a role in the pathogenesis of Alzheimer's disease (AD) as the zinc cation acts as a potent trigger for beta-amyloid aggregation and plaque formation. Zinc is indeed found in high concentrations in mature amyloid plaques and its chelation has been found to effectively resolubilize beta-amyloid from human postmortem AD plaques. These data suggest that the use of zinc supplements in elderly people should be considered only after a careful evaluation of the zinc status of the subjects as well as their genetic background particularly those genes related to the expression and mutation of proteins involved in Zn^{2+} homeostasis.

Session 2) Zinc and oxidative stress

In view of the fact that the release of zinc from MT represents an intracellular response to stress, biochemical modification of stress-related proteins might represent a useful target to influence zinc homeostasis and related mechanisms in ageing. **Alexander Bürkle (University of Konstanz, Germany)** [7,8] established a FACS-based immunoassay for the quantitative assessment for poly(ADP-ribose) polymerase 1, an abundant nuclear enzyme that binds via its zinc finger motifs to DNA with single or double strand breaks. The maximal level of PARP-1 activity is strongly correlated with life span of mammalian species, whereas within a given species maximal PARP-1 activity tends to decrease with donor age. Using this FACS-based immunoassay this group is addressing the possible link between PARP-1 activity and zinc status in humans. This aspect was extended by **Andrea Kunzmann (University of Konstanz, Germany)** who showed how cellular poly(ADP-ribosyl)ation capacity is modulated by *in vitro* zinc supplementation in PBMC.

As cellular poly(ADP-ribosyl)ation capacity is related to DNA damage and repair, it is relevant to study altogether these aspects in order to understand the impact on the functional status of the DNA repair mechanisms. With this aim, in the "young scientists session", **María Moreno-Villanueva (University of Konstanz, Germany)** addressed the influence of in *vitro* zinc on the repair capacity of Jurkat cells and human PBMC using an automated version of the fluorescence-detected alkali DNA unwinding (FADU) assay for the analysis of cellular DNA repair capacity. It appears that DNA repair capacity of PBMCs even from young, healthy donors can be increased by the simple addition of zinc in the physiological range. The results were very similar to the increase in poly(ADP-ribosyl)ation capacity.

A common cause of DNA damage and triggering of repair is the production of reactive oxygen species (ROS). **Jolanta Jajte (Medical University of Lodz, Poland)** [9] is assessing, by FACS and spectrofluorimetric method analysis, the modification of various cell components by ROS which are implicated in ageing and in numerous human diseases, such as cardiovascular disease, neurodegenerative processes and cancer. She analyzed the generation of ROS species in lymphocyte of healthy elderly subjects and atherosclerotic old patients and found a significant correlation between ROS generation and pathological changes in old atherosclerotic patients.

Protection against enhanced exposure to ROS, as it occurs in ageing, is mainly achieved by the gene expression of stress-related proteins such as Clusterin/Apoliprotein J (ApoJ). **Efstathios S. Gonos (National Hellenic Research Foundation, Athens, Greece)** approached ageing and longevity at the molecular level by studying the functions and the relevance for successful ageing of ApoJ. This has been recently identified as a novel survival factor [10] based on its cytoprotective function, which was demonstrated also by the sensitization of cell towards cytotoxicity resulting from suppression of ApoJ expression.

In the "young scientists session" **Ioannis P. Trougakos (National Hellenic Research Foundation, Athens, Greece)** further showed that ApoJ expression can be modulated by zinc and that ApoJ levels in the plasma may be used as a biochemical marker of zinc status.

Besides work on Apo J, the **Gonos** group set up an overall molecular and biochemical approach to understand proteasome functions in replicative senescence and cell survival, thus creating the basis for a possible investigation on the role of zinc in proteasome functions.

The accumulation of oxidatively modified proteins may represent an important hallmark of cellular ageing and pathology that is associated with oxidative/nitrosative stress. **Marco Colasanti** and **Giovanni Musci (University of Rome 3, Rome, Italy)** [11] determined the age-related changes occurring in MT and other zinc-dependent proteins, such as Specific Protein-1 (SP-1), showing for the first time that these proteins may be glutathionylated and that their important role in the adaptive cellular response to oxidative and nitrosative insults during ageing might thereby be lost. In addition, this group found that MT may also be differently glutathionylated upon ageing suggesting the presence of specific changes involving different MT isoforms.

Given the possibility that MT may become dysfunctional during ageing, corresponding changes in the activity of other zinc dependent enzymes might be found. Methionine sulfoxide reductase B (MsrB) is a zinc dependent protein-repairing enzymes that together with MsrA has the specific function of removing oxidatively-damaged