

## Facing challenges in an ageing world

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The 9th European Congress of Biogerontology (9th ECB), under the auspice of the International Association of Gerontology and Geriatrics- European Region (IAGG-ER), was held in Sevilla, Spain, 16–18 October, 2014. This special issue of Biogerontology includes 9 papers selected from more than 67 lectures and abstracts presented at the Congress, from participants from 14 countries worldwide (see book of abstracts at: <http://upo.es/9ECB/>). The theme of the congress “Facing Challenges in an Ageing World”, covered a wide range of topics from molecular basis to epidemiological aspects of the ageing populations and novel ageing interventions. What follows is a brief commentary on the papers published in this special issue. The relationship between genes and life-style as determinant of longevity is discussed by Irene Maeve Rea and colleagues (Rea et al. 2015), in a series of studies performed with a group of nonagenarians in Belfast (UK). Interestingly, this study shows the themes selected by the nonagenarians themselves as important pointers in their age-span and health-span.

The importance of diet in longevity is reviewed in the work of José Villalba group (Villalba et al. 2015) highlighting that a protected membrane environment enriched in monounsaturated fatty acids is essential in healthspan and longevity. Two review articles discuss the complex function of mitochondria in ageing. For example, the group of Giuseppe Passarino from Calabria, Italy (D’Aquila et al. 2015) presents the important role of mitochondrial epigenetics in ageing. This work summarizes the involvement of mitochondrial function and the communication between mitochondria and nucleus in the regulation of nuclear epigenome and the role of epigenetic modifications in the mitochondrial DNA. On the other hand, LópezLluch and colleagues show a compilation of the studies performed in mitochondria of different organisms. The accumulation of damaged mitochondria during aging increases ROS production and oxidative damage but the induction of mechanisms involved in mitochondrial turnover, increasing biogenesis at the same time that induces the elimination of damaged mitochondria through mito/autophagy, increases mitochondrial efficiency and reduces ROS-dependent damage. Many hormetins such as calorie restriction, resveratrol and other bioactive compounds and physical activity activate the molecular pathways involved in this mitochondrial turnover (López-Lluch et al. 2015).

Several original research articles included in this special issue present different aspects of the activity of antioxidants or bioactive compounds in blood (Jansen et al. 2015; Capeleto et al. 2015), the gender importance in fat accumulation during ageing (Castillo et al. 2015), and the importance of the immune system during ageing (Campos et al. 2015; Di Benedetto et al. 2015).

Changes in the activity of the immune system are deeply associated with ageing. For this reason, this topic was treated in a specific section in the 9th ECB. Two papers included in this issue show different aspects of the evolution of the immune system during ageing. Rafael Solana’s group from Córdoba, Spain, studies the expression of different natural killer (NK) activating receptors in the different NK cell subsets in order to understand the deterioration of these cells during ageing (Campos et al. 2015). Graham Pawelec’s group from Tübingen, Germany, discusses the impact of age, sex and CMV-infection on T cells (Di Benedetto et al. 2015). The study of these factors on T cells from participants in the Berlin Aging Study II (BASE-II) demonstrated differences in the frequency of naïve CD8+ cells (effectors) dependent on age and sex and CMV-infection.

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