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Dpt. of Gerontology
Vrije Universiteit Brussel.

PhD in Medical Sciences
2014-2015

INVITATION to the Public defence of

Oscar ONYEMA

To obtain the academic degree of '**DOCTOR IN MEDICAL SCIENCES**'

Characterization of senescent T-cells and their contribution to in vivo immunosenescence in humans**Wednesday 6 May 2015**

Auditorium **Vanden Driessche**, 17:00
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:
<http://www.vub.ac.be/english/infoabout/campuses>



Vrije Universiteit Brussel

Summary of the dissertation

Cellular senescence is believed to contribute to the aging process, and CD28⁻, CD57⁺ and KLRG1⁺ are cell surface markers that have been used to describe such "senescent cells" among human T-lymphocytes. By combining the expression of CD28, CD57 and KLRG1 on the cells, we showed that only CD57⁺ cells accumulated significantly in the elderly compared with the young people, notwithstanding their CD28 and KLRG1 phenotypes. Two distinct CD57⁺ subpopulations: CD28⁺CD57⁺ and CD28⁻CD57⁺ cells were distinguished. The expression of the senescence markers, p16 and p21 was higher in CD28⁺CD57⁺ cells than in other subpopulations in both age groups; the expression of p21 was age-related, which was not the case for p16. CMV infection and shifts in subpopulations were not likely explanations of the observed differences. Further characterization of subpopulations of CD8⁺ T-cells with markers of cellular senescence, apoptosis, differentiation and homing, favours CD28⁺CD57⁺ cells as senescent phenotypes. Differences in the expression of the homing and differentiation markers among CD28⁺CD57⁺ and CD28⁻CD57⁺ cells might indicate senescent cells of different origins.

Following the administration of chemotherapy to patients with breast or lung cancer, the number of non-senescent cells decreased faster than CD28⁺CD57⁺ and CD28⁻CD57⁺ cells. Also, a tendency of chemotherapy to induce senescent cells was observed among CD28⁺CD57⁺ cells. Compared to control persons, the CD8⁺ T-cell subpopulations of cancer patients presented an immunosenescence profile: we observed a lower CD8⁻/CD8⁺ ratio and higher proportion of CD28⁻CD57⁺ cells, persisting throughout the observation period. The differences in frequency of CD8⁺ subtypes correspond to those seen in the Immune Risk Profile and appear to be more pronounced with cancer disease advancement.

Concluding, this work provides further in vivo evidence on the existence of senescent T-cells, and their contribution to immunosenescence in aging and cancer.

Curriculum Vitae

Oscar Okwudiri Onyema was born in Lagos, Nigeria on 25th July, 1974; he grew up in his home state, Imo, where he did his primary education at Community School Umuagii Obike (1980-1985), his secondary education at Ngor Okpala High School (1986-1991) and his initial tertiary education at the Federal University of Technology, Owerri (1995-1999), where he obtained a bachelor's degree in Biological Sciences (Biochemistry Option). As the best student in his class, Oscar remained a University scholar throughout the five years of his first degree study. After his graduation and following his completion of the compulsory one year national service, he was called back by his Alma Mater to join the academic staff of the University. To continue his quest for knowledge and personal development, he proceeded to the University of Ibadan, where he obtained a master's degree in Biochemistry in 2004. He arrived Belgium in September 2006 by virtue of a scholarship granted him by the Vrije Universiteit Brussel (VUB) to pursue a master's degree in Medical and Pharmaceutical Research, which he completed in 2008 and was granted another scholarship by the same University to pursue a doctorate degree in Medical Sciences. Between 2012 and 2014 he worked as a teaching/research assistant at the VUB. His research experience has taken him through different aspects of Biomedical Sciences including Toxicology, Cell Biology, and recently, Gerontology and Immunology. He has a number of papers published in international peer-reviewed journals to his credit and has attended several International and national conferences where he made oral and poster presentations. Oscar is married to his 'Sunshine', Adaeze and their marriage is blessed with two lovely children, Chibuihem and Chinazom.