conferenceseries.com

J Tissue Sci Eng 2017, 8:3 (Suppl)
DOI: 10.4172/2157-7552-C1-037

Cellular aging of the immune system: Causes and consequences

Renu Balyan[1,4], Rupali Gund[1], Amanpreet Singh Chawla[1], Saurabh Pradhan[2], Satyajeet Khare[2], Sanjeev Galande[2], Jeannine Durdik[3], Anna George[1], Vineeta Bal[1] and Satyajit Rath[1]

[1]National Institute of Immunology, India
[2]Indian Institute of Science Education and Research, India
[3]University of Arkansas, USA
[4]National University of Singapore, Singapore

Functional heterogeneity in apparently homogenous T-cell populations has been well reported. However, what factors lead to such variations within a T-cell population is still unclear. Depending upon the time of egress from the thymus and duration of residence in the peripheral lymphoid organs, individual cells would be of relatively different ages, however, consequences of such cellular aging have not been addressed as there are no phenotypic markers to estimate the age of individual naive T-cells. We show that CD8 levels reduce over time, as a result of MHC-I mediated tonic signals and lower CD8 levels can be used as a surrogate marker to identify relatively aged cells in a naive CD8 T-cell population. We observed that naive CD8 T-cells from aged mice have lower CD8 levels than naive CD8 T-cells of young mice. Further, when naive T-cells from young mice are separated into CD8-hi and CD8-lo subsets, we find that CD8-lo cells are smaller, respond poorly and are more susceptible to death. Bulk mRNA sequencing showed that peripheral MHC-I-mediated tonic signaling leads to post-thymic age-associated differences in CD8 T-cells and major changes in their signaling, transcriptional and functional landscapes. Our findings also suggest the feasibility of potential pharmacological interventions for improved T-cell responses during vaccination of older people via either anti-oxidant or DUSP (Dual-specificity phosphatase) inhibitor small molecules.

zhuimengzhew@163.com