Association found between length of biological marker and development of respiratory infection

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Among healthy adults who were administered a cold virus, those with shorter telomere length (a structure at the end of a chromosome) in certain cells were more likely to develop experimentally-induced upper respiratory infection than participants with longer telomeres, according to results of preliminary research published in the February 20 issue of *JAMA*.

Telomeres shorten with each cell division and function as protective caps to prevent erosion of genomic DNA during cell division. Telomere shortening in leukocytes (white blood cells) has implications for immunocompetence and is associated with poorer antibody response to vaccines. "Shorter leukocyte telomere length also is associated with aging-related illness and death from conditions with immune system involvement, including infectious diseases, cancer, and cardiovascular disease," the authors write. It is not known whether leukocyte telomere length is related to acute disease in younger, healthy populations.

Sheldon Cohen, Ph.D., of Carnegie Mellon University, Pittsburgh, and colleagues conducted a study to determine whether shorter telomeres in leukocytes, especially CD8CD28- T cells, are associated with decreased resistance to upper respiratory infection and clinical illness in young to middle-aged adults. Between 2008 and 2011, telomere length was assessed in peripheral blood mononuclear cells (PBMCs) and T-cell subsets (CD4, CD8CD28+ , CD8CD28-) from 152 healthy 18- to

55-year-old residents of Pittsburgh. Participants were subsequently quarantined (single rooms), administered nasal drops containing a common cold virus (rhinovirus 39), and monitored for 5 days for development of infection and clinical illness.

Sixty-nine percent of participants (n = 105) developed respiratory infections; 22 percent of the entire sample (n = 33) developed a clinical illness (common cold).The researchers found that shorter telomere lengths in all 4 cell types were associated with increased odds of infection following exposure to RV39. However, CD8CD28- telomere length had the largest association with infection. The rate of infection in the CD8CD28- subset was 77 percent among participants in the group with the shortest telomeres and 50 percent for those in the group with the longest telomeres.

Analysis indicated that only telomere length in the CD8CD28- subset was associated with risk for clinical illness, with shorter telomere length associated with increased risk. Among participants with the shortest telomeres, 26 percent became clinically ill. The rate for clinical illness was 13 percent for those in the group with the longest telomeres.

Also, the magnitude of the association between CD8CD28- telomere length and infection increased with increasing age.

"In this study of healthy young and midlife adults, shorter CD8CD28- cell telomere length was associated with upper respiratory tract infection and clinical illness following experimental exposure to rhinovirus. Because these data are preliminary, their clinical implications are unknown," the authors conclude.

More information: *JAMA*. 2013;309(7):699-705