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Author: Niki L. Reynaert Poornima Gopal Erica P.A. Rutten Emiel F.M. Wouters Casper G. Schalkwijk

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Advanced glycation end products and their receptor in age-related, non-communicable chronic inflammatory diseases; overview of clinical evidence and potential contributions to disease.

Niki L Reynaert[a*], Poornima Gopal[a], Erica PA Rutten[b], Emiel FM Wouters[a,b], Casper G Schalkwijk[c]

[a]Department of Respiratory Medicine and [c]Department of Internal Medicine, Maastricht University Medical Center+ (MUMC), Maastricht, the Netherlands; [b]Centre of expertise for chronic organ failure (Ciro) – Horn, the Netherlands.

*** Corresponding Author**
Niki L Reynaert, PhD
Department of Respiratory Medicine
Maastricht University Medical Centre
PO Box 616
6200MD Maastricht, The Netherlands
Tel: +31 43 3882270
Fax: +31 43 3875051 / 7087
n.reynaert@maastrichtuniversity.nl

Abstract

Age-related, non-communicable chronic inflammatory diseases represent the major 21st century health problem. Especially in Western countries, the prevalence of non-communicable diseases like chronic obstructive pulmonary disease, cardiovascular disease, type 2 diabetes and osteoporosis is exponentially rising as the population ages. These diseases are determined by common risk factors and share an age-related onset. The affected organs display evidence of accelerated ageing, and are hallmarked by chronic inflammation and oxidative stress. The receptor for advanced glycation end products (RAGE) has been implicated in a number of inflammatory diseases and plays a central role in amplifying inflammatory responses. Advanced glycation end product (AGE) formation and accumulation is accelerated under these conditions. Advanced glycation end products are not only linked to RAGE signaling and inflammation, but to various hallmarks of the ageing process. In addition to these biological functions, circulating levels of the soluble form of RAGE and of advanced glycation end products are candidate biomarkers for many age-related inflammatory diseases. The purpose of this review is to provide an overview of the mechanistic connections between RAGE and advanced glycation end products and the processes of inflammation and ageing. Furthermore, through the presented overview of AGE-RAGE alterations that have been described in clinical studies in chronic obstructive pulmonary disease, cardiovascular disease, type 2 diabetes and osteoporosis, and insight obtained