

■ A. Nemmar, P.H.M. Hoet, B. Vanquickenborne, D. Dinsdale, M. Thomeer, M.F. Hoylaerts, H. Vanbilloen, L. Mortelmans, and B. Nemery

Passage of Inhaled Particles Into the Blood Circulation in Humans
Circulation 105: 411-414.

Abstract 1 of 1 ■ (Circulation. 2002;105:411.)

© 2002 American Heart Association, Inc.

Brief Rapid Communications

Passage of Inhaled Particles Into the Blood Circulation in Humans

A. Nemmar, DVM, PhD; P.H.M. Hoet, PhD; B. Vanquickenborne, MD; D. Dinsdale, PhD; M. Thomeer, MD; M.F. Hoylaerts, PhD; H. Vanbilloen, PhD; L. Mortelmans, MD, PhD; B. Nemery, MD, PhD

From the Laboratory of Pneumology (Lung Toxicology) (A.N., P.H.M.H., M.T., B.N.), Nuclear Medicine (B.V., H.V., L.M.), and Center for Molecular and Vascular Biology (M.F.H.), Katholieke Universiteit Leuven, Leuven, Belgium; and the MRC Toxicology Unit (D.D.), Leicester, UK.

Correspondence to Prof B. Nemery, K.U.Leuven, Laboratorium voor Pneumologie (Longtoxicologie), Herestraat 49, B-3000 Leuven, Belgium. E-mail ben.nemery@med.kuleuven.ac.be

Background— Pollution by particulates has been consistently associated with increased cardiovascular morbidity and mortality. However, the mechanisms responsible for these effects are not well-elucidated.

Methods and Results— To assess to what extent and how rapidly inhaled pollutant particles pass into the systemic circulation, we measured, in 5 healthy volunteers, the distribution of radioactivity after the inhalation of "Technegas," an aerosol consisting mainly of ultrafine ^{99m}Tc -labeled carbon particles (<100 nm). Radioactivity was detected in blood already at 1 minute, reached a maximum between 10 and 20 minutes, and remained at this level up to 60 minutes. Thin layer chromatography of blood showed that in addition to a species corresponding to oxidized ^{99m}Tc , ie, pertechnetate, there was also a species corresponding to particle-bound ^{99m}Tc . Gamma camera images showed substantial radioactivity over the liver and other areas of the body.

Conclusions— We conclude that inhaled ^{99m}Tc -labeled ultrafine carbon particles pass rapidly into the systemic circulation, and this process could account for the well-established, but poorly understood, extrapulmonary effects of air pollution.

[Copyright © 2002 by the American Heart Association.](#)