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TITLE: PASSAGE OF INHALED PARTICLES INTO THE BLOOD CIRCULATION IN HUMANS.

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ABSTRACT: **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)Technetium-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.