Many epidemiological studies, controlled human exposures, and animal studies show that inhaling some particles may increase blood pressure. In my laboratory, we study ambient air pollution with animal models and have shown increases in blood pressure of both dogs and rats with inhalation of either concentrated ambient air pollution particles or traffic-related particles. In these studies blood pressure is measured continuously by telemetry throughout the exposure. Indeed, in these studies, we have shown that traffic-related particles at 50 µg/m³ produces increases in blood pressure, and have shown this is not a simple sympathetic nervous system response. However, the biological mechanisms by which blood pressure increases with inhalation of particles remain unclear because the initiation and modulation of blood pressure changes in this setting are quite complex. Evidence will be presented that shows involvement by: 1) reflex pathways including the stimulation of neural receptors in the airways that then can mediate vascular tone via the autonomic nervous system and the baroreceptor reflex; 2) stimulation and release of vasoactive mediators from the lung; and 3) dissolution of soluble particle constituents (organic and inorganic) into the circulation which can then have direct effects on the vasculature or effects via the renin-angiotensin, endothelin, or other mediator systems that control vascular tone and blood pressure. Understanding blood pressure responses to particle inhalation may be key to defining mechanisms of cardiovascular disease mortality and morbidity associated with air pollution.

Biography

Dr. John Godleski was born in Nanticoke, Pennsylvania. Graduated from King’s College in Wilkes-Barre, Pennsylvania and received his MD from University of Pittsburgh. He trained in Pathology at Massachusetts General Hospital and had Post-Doctoral research training at Harvard School of Public Health and did a Post-Doctoral teaching fellowship at University of North Carolina School of Medicine, Department of Pathology. Dr. Godleski’s research focuses upon the role of inhaled practices in the development of pulmonary and systemic diseases including responses to inhaled particulates using novel exposure models developed to assess health effects of “real world” ambient atmospheric particles. He is Associate Professor of Pathology at Brigham and Women’s Hospital, Harvard Medical School and in the Department of Environmental Health at Harvard School of Public Health, where he is Co-Director of the Harvard-EPA Clean Air Research Center and head of the Inhaled Particles Research Core in the NIEHS Center at HSPH.

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