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Black lung disease is mostly caused by silica toxicity and silica toxicity is caused by contamination with calcium

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Toxic dusts like coal and silica, present a confusing picture regarding toxicity when inhaled into the lung. Why should such dusts be inherently inflammatory and/or toxic both in the short and particularly in the long term? Since these dusts create at first acute and then chronic diseases- are there important ways to treat these diseases once they have begun their inevitable course. Mine dusts are a complex mixture of different compositions of dust but almost all coal dust contains both the dust from coal (carbon) and rock dust (silica). We have found that the silica has a major contaminant since X-ray microanalysis indicates two clear peaks –one for SiO2(-2) and one for Ca+2. We dripped a slurry of silica powder into lungs of rats under anesthesia. Twenty-four hours post silica exposure- luminescence- from the lavage cells were assayed using L-012 and the peroxynitrite-based light was 10-fold higher which could be completely inhibited by dexamethasone. In the treated silica animal, the nitric oxide production increased 10-fold without dexamethasone-steroid. After 6 weeks, the luminescence was increased 1000-fold. But, then the steroid had no effect because induction of nitric oxide synthase had already occurred. Steroids are not effective for chronic diseases, since the epigenetic deacetylation mechanism used by steroids is damaged by excessive peroxynitrite. This same scenario occurs in humans if a person has inhaled silica, the acute disease can be controlled using chronic steroids but if they are withdrawn, the patient will die. The development into the chronic state must be stopped to preserve life.

Biography

Knox Van Dyke is a Professor of Biochemistry and Molecular Pharmacology at West Virginia University Medical School with 50 years of research experience. He completed his PhD in Biochemistry in the Edward A Doisy–Nobel Prize Department at Saint Louis University in 1966. He did Post-doctoral studies in the Department of Pharmacology at West Virginia University Medical School. During this time, he developed the first effective drug screening system for antimalarial drugs while screening over 10,000 drugs. Mefloquine and halofantrine were recognized by this screening system and were further developed by Walter Reed and various companies as patented drugs. He first solved the problem of black lung disease and silicosis by demonstrating that coal dust per se is not particularly toxic to human cells compared to silica and that silica is not particularly toxic alone but it is contaminated with calcium. He recognized that urate in the blood protects against peroxynitrite generating chronic diseases. He has recognized that many chronic diseases like cancer, arthritis, diabetes and heart diseases etc., are caused by excessive peroxynitrite or its derivatives. He has over 300 publications and 150 patents.

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