

Lev S. Ruzer

Nanoparticles in Humans

Experiments, Methods, and Strategies



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*I dedicate this work to my dearest friend,
Professor Tatjana Tolstikova*

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Preface

The history of radon and the associated health effect (lung cancer) is very long—from the 15th century—and it consists of two parts: radon in mines and residential radon. In the majority of studies, radon measurements were provided as a proof of the effect (lung cancer). However, radon is an inert gas, and it is not precipitated (not remained) in the lung. Therefore, it cannot be completely responsible for lung irradiation and correspondingly lung cancer. Radon progeny precipitate in the lung. They also can precipitate to the particles, including particles in the nanometer range, and therefore they can be used as radioactive markers in the study of nanoparticles.

This book presents new ideas, methods, and some experimental results to measure the surface area and local deposition of nanoparticles in lungs and the true effectiveness of respirators, together with a nanoparticle dosimetric road map that can be used as a general strategy for the assessment of dose, which is the most important physical cause of the health effect in case of nanoparticle exposure. It proposes the use of 1 nm radioactive particles, called unattached activity of radon progeny, as a safe experimental tool for nanoparticle studies, including human studies. Such ideas have not been presented before. The text includes some discussion on radon from the historical point of view.

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