



## The Emerging Role of Molecular Radiation Sciences in Biomedical Applications

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### Message from the Guest Editors

The current practice of radiotherapy and radiation protection relies on radiation absorbed dose calculations averaged over macroscopic target and non-target volumes, which are subsequently combined with empirical dose-response models to predict radiation effects at the tissue, organ, and whole-body level. This is several orders of magnitude higher than the molecular scale that dictates radiobiological effects at the cellular and DNA levels. Molecular radiation science provides the scientific framework for developing mechanistically motivated radiation bioeffect models that may supplement (or replace) empirical models in non-conventional exposure scenarios where epidemiological data are limited. Furthermore, molecular radiation science offers the potential of predicting cellular radiation effects a priori, by following the complete chain from the physical interactions to the chemical reactions and biological damage. The present Special Issue is envisioned to motivate further advancements in all aspects of molecular radiation sciences (which includes radiation physics, chemistry, and biology) to fill the aforementioned knowledge gap.





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