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## Preface

This textbook on *Molecular Radio-Oncology* is targeting physicians and preclinical researchers with interest in translational radiation oncology.

The first part of the book takes up current knowledge about important molecular radiobiological mechanisms and preclinical investigations on target identification and personalization for combined treatments, DNA repair, and cancer stem cells.

In the second part, potential biomarkers for personalized radiation oncology are described from their preclinical basis to translational and clinical data. The epidermal growth factor receptor (EGFR) and tumor hypoxia are examples of long-identified biomarkers that over time have been used as both prognostic markers and targets for combined treatments. Human papillomavirus infections are increasingly evident in different tumor entities, have been shown to determine prognosis of the patients, and are currently tested as basis for interventions in clinical trials.

The third part of the book refers to the utilization of radiobiological knowledge for the application of molecular imaging techniques in radiation oncology. Fluoro-deoxyglucose (FDG) is the most widely used tracer for positron emission tomography (PET) and indicates not only active tumor tissue with an often higher sensitivity compared to standard sectional imaging techniques, but has also prognostic value for the outcome of radiotherapy. <sup>18</sup>F-Misonidazole PET is described as an example of bioimaging of a factor of radioresistance—under the view of utilization as a biomarker for the outcome of radiotherapy as well as of automatic contouring methods for reproducible evaluation.

All chapters are authored by eminent researchers and physicians in the respective fields with a broad experience in preclinical and clinical radiation oncology and long-term teaching experiences who have put a focus on clarity and comprehensiveness of the content of the different chapters.

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Molecular Radio-Oncology

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