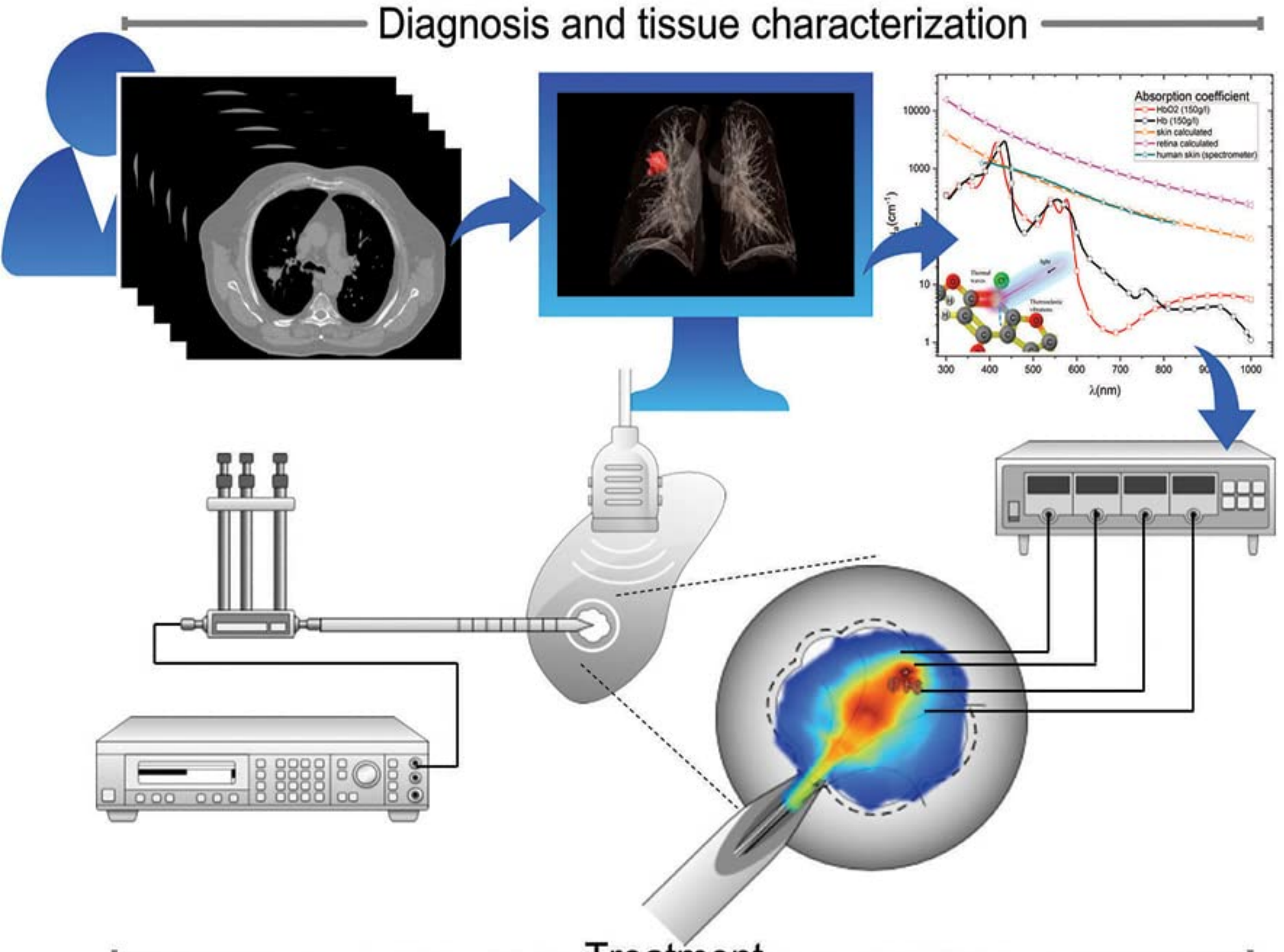
DIAGNOSIS AND TREATMENT OF CANCER USING THERMAL THERAPIES

MINIMAL AND NON-INVASIVE TECHNIQUES

Citlalli J. Trujillo-Romero *and* **Dora-Luz Flores** (*eds.*)



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Contents

Chapter 9

Biological Effects of Thermal Therapies (EM Waves and Mechanical Waves)

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Thermal therapies based on the exposition of the tumor to electromagnetic (EM) fields or ultrasonic energy produce several thermal and biological effects. Due to thermal therapies are based on the application of non-ionizing radiations, heating tissue is the expected outcome. However, it is required to increase the tumor temperature up to therapeutic levels (hyperthermia or thermal ablation) without affecting the surrounding healthy tissue. Tissue thermal injury will always depend on the energy/powers applied as well as the reached temperature and treatment time. The temperature increase produces several biological effects not only on the healthy tissue but also on the tumor. Physiological changes such as blood perfusion, vascular permeability, and metabolism are modified by the temperature increase. These conditions, together with the rates of cell survival due to heat, tumor conditions, and tissue thermotolerance are the main reasons for thermotherapy success.

9.1