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MOLECULAR GENETICS AND EPIGENETICS IN CANCER: SCIENCE FICTION OR A CERTAINTY IN THERAPEUTIC MANAGEMENT

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In recent years, advances in molecular medicine have launched disruptive innovations in cancer diagnostics and therapeutics. The advent of genomics and epigenomics has revolutionized our understanding of cancer as several different biologically and molecularly distinct diseases. Molecular profiling, the classification of tissue or other specimens for diagnostic, prognostic, and predictive purposes based on multiple gene expression, is a technology that holds major promise for optimizing the management of patients with cancer. However, the use of these tests for clinical decision making presents many challenges to overcome. Personalized medicine is defined by therapy decisions tailored to individual patients, aiming to improve therapeutic efficiencies and to minimize side effects. The current clinical practice includes targeted therapies for disease-related alterations and molecular biomarker-based patient stratification. However, recent advances in screening technologies have enabled more comprehensive identification strategies and suggest a plethora of additional valuable biomarkers and druggable molecules for future clinical applications. Beside genetic alterations, in particular, epigenetic biomarkers emerge into the field by presenting stable modifications (e.g. DNA and histone modifications) with predictive potential for drug treatment efficiencies, especially in a cancer context. In this talk, we'll summarize the current use of genetics and epigentics for treatment efficiencies and evaluate their translational value into clinical use in cancer.

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