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Genitourinary Tumors: Update on Molecular Biomarkers for Diagnosis, Prognosis and Prediction of Response to Therapy.

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BACKGROUND: Research of biomarkers in genitourinary tumors goes along with development of complex emerging techniques ranging from next generation sequencing platforms, applied to archival pathology specimens, cytological samples, liquid biopsies, and to patient-derived tumor models.

METHOD: This contribution is an update on molecular biomarkers for diagnosis, prognosis and prediction of response to therapy in genitourinary tumors. The following major topics are dealt with: Immunological biomarkers, including the microbiome, and their potential role and caveats in renal cell carcinoma, bladder and prostate cancers and testicular germ cell tumors; Tissue biomarkers for imaging and therapy, with emphasis on Prostate-specific membrane antigen in prostate cancer; Liquid biomarkers in prostate cancer, including circulating tumor cell isolation and characterization in renal cell carcinoma, bladder cancer with emphasis on biomarkers detectable in the urine and testicular germ cell tumors; and Biomarkers and economic sustainability.

CONCLUSION: The identification of effective biomarkers has become a major focus in cancer research, mainly due to the necessity of selecting potentially responsive patients in order to improve their outcomes, as well as to reduce the toxicity and costs related to ineffective treatments.

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KEYWORDS: Genitourinary tumors; PSMA; bladder cancer; immunotherapy; liquid biopsy; microbiome; prostate cancer; renal cell carcinoma

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