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Apparent diffusion coefficient in the analysis of prostate cancer: determination of optimal b-value pair to differentiate normal from malignant tissue

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**1. Introduction**

Diagnosing prostate disease is a complex task and typically requires a combination of clinical, biochemical and imaging biomarkers [1,2]. Specifically, the diagnosis of prostate cancer (PCa) is based on clinical symptoms, digital rectal examination, prostate specific antigen (PSA) levels, transrectal ultrasonography (TRUS) and tissue sample biopsy guided by TRUS, from which histopathological tissues are graded using the Gleason Score (GS). Despite advances in these techniques, the accuracy of the tests remains limited, missing some PCa cases [3].

Multi-parametric magnetic resonance imaging (MP-MRI) can aid in the detection and characterization of PCa combining anatomical, functional and molecular imaging, providing improved support for decision-making regarding clinical treatment [4,5]. This MP-MRI approach includes the use of diffusion-weighted imaging (DWI) for studying the prostate. DWI provides qualitative and quantitative microstructural information, in a non-invasive manner, making use of water diffusion to probe prostatic tissue [6]. DWI measures the motion of water molecules within tissues, which is influenced by the presence of intra and extracellular compartments as well as

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