

Exploring PIXE Applications in Oncology: A Comprehensive Review

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Abstract: *In synthesizing the findings from the literature on the application of Particle Induced X-ray Emission (PIXE) in cancer research, it is evident that this analytical technique has markedly advanced our understanding of the role trace elements play in cancer etiology and progression. Key insights indicate that trace elements such as iron (Fe), copper (Cu), and nickel (Ni) are significantly elevated in cancerous tissues compared to normal counterparts, establishing a compelling link between elemental imbalances and cancer pathophysiology. Deficiencies in essential trace elements like selenium (Se) and zinc (Zn) correlate with compromised immune function, suggesting a broader interconnectedness that warrants attention in clinical settings. The review illustrates PIXE's potential as not only a tool for elemental quantification but also a mechanism for uncovering biomarker candidates, enhancing diagnostic precision and prognostic accuracy across various cancers, including breast, lung, and prostate cancer.*

Keywords: PIXE, Trace Elements, Cancer, X-rays

