Title: Precision radiation measurement: $LiZnBO_3$:Ce phosphor thermoluminescent properties

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Abastact: Lung cancer (LC) remains the leading cause of global cancer-related death due to delayed diagnosis, poor therapeutic efficacy, and drug resistance. Traditional therapeutic methods like radiation, chemotherapy, and targeted medicines are often associated with high toxicity and often result in minimal survival improvements. Phytochemicals from medicinal plants are increasingly being considered as potential LC treatment agents due to their multi-targeted action, safety, and accessibility. These have anticancer properties by regulating key molecular signaling pathways like PI3K/Akt/mTOR, MAPK/ERK, NF-κB, STAT3, and apoptotic cascades. These compounds also promote apoptosis, increase chemotherapeutic medication sensitivity, and prevent tumor cell growth, angiogenesis, invasion, and metastasis. Phytochemicals have shown potential in reducing therapy-induced side effects and combating multidrug resistance, potentially enhancing treatment effectiveness. Despite promising discoveries, challenges such as low bioavailability, limited pharmacokinetic stability, and lack of extensive clinical validation inhibit their widespread use. This review provides clinical insights into phytochemical-based LC preventive and treatment approaches, focusing on their role in addressing molecular signaling pathways. It demonstrates the potential medicinal benefits, potential disadvantages, and potential applications of phytocompounds as supplementary or alternative treatments for LC.

Keywords: lung cancer; molecular signaling pathways; phytochemicals; prevention; targeted therapy; treatment strategies.

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