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Mapping the landscape of vitamin D in cancer studies: a systematic global investigation

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Abstract

Purpose: This comprehensive study examines the multifaceted relationship between vitamin D and cancer, synthesizing key scientific advancements and global research trends to guide future investigations and address critical gaps in the field.

Methods: Publications on vitamin D and cancer were retrieved from Scopus up to November 2024. English-language original and review articles were analyzed using Excel, VOSviewer, and Scimago Graphica, focusing on publication trends, citation impacts, and research themes.

Results: A total of 11,442 publications (80.01% original articles, 19.98% reviews; 51.24% open access) were analyzed. The United States of America led in publications (38.3%) and citations (56.2%), followed by China (7.7%) and the United Kingdom (7.2%) in output, and the United Kingdom (10.6%) and Germany (6.4%) in citations. Countries with the highest citations per document were Belgium (103.4), Slovenia (87.9), and Puerto Rico (76.6). The most frequently studied cancers in relation to vitamin D were breast, colorectal, prostate, skin, lung, ovarian, pancreatic, gastric, hepatocellular, thyroid, leukemia, multiple myeloma, bladder, lymphoma, osteosarcoma, cervical, endometrial, and glioblastoma, respectively. Cluster analysis revealed key patterns related to vitamin D: Calcitriol's chemopreventive role in breast, prostate, and colorectal cancers, dietary vitamin D for its involvement in ovarian cancer, vitamin D for regulation of cancer-related hypercalcemia, vitamin D deficiency links to inflammation-obesity-cancer risk, VDR polymorphisms affecting outcomes in lung and colorectal cancers, and vitamin D's photoprotective effects on skin malignancies, and vitamin D in ulcerative colitis-related cancer. The most cited articles emphasized optimal vitamin D levels and cancer prevention.

Conclusion: This study highlights the extensive research on vitamin D and its complex links to cancer, emphasizing future prospects with a focus on precision medicine approaches, including targeted supplementation and genomic analyses, to better address individual variability in cancer prevention and treatment.

Keywords: Bibliometric; Cancer; Mapping; Scientometric; Trend; Vitamin D.