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Analytical applications of chemiluminescence methods for cancer detection and therapy

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- Chemiluminescence (CL) for cancer imaging
- CL determination of cancer biomarkers
- CL determination of circulating tumor cells
- CL for photodynamic therapy

ABSTRACT

Cancer is one of the most life-threatening diseases and a leading cause of death and disability for humans. The current state of the art in chemiluminescence (CL) detection methods provides clinicians and researchers interested in oncology with efficient tools for early detection and accurate diagnosis of cancer. In this context, CL methods are powerful with the capability of detecting cancerous cells and cancer biomarkers, among other applications. Moreover, these methods can aid in increasing the survival chances of cancer patients undergoing chemotherapy and radiotherapy by sensitive monitoring of their progress when undergoing treatment. This article reviews the literature on the applications of CL methods in cancer detection and therapy (e.g., determination of circulating tumor cells, cancer biomarkers and anticancer drugs, and photodynamic therapy as a light-delivery system and dosimetry tool).

Keywords:

Anticancer drug

Cancer

Cancer biomarker

Cancer detection

Cancer therapy

Chemiluminescence

Circulating tumor cell

Dosimetry

Light delivery

Photodynamic therapy

Abbreviations: ABEI, N-(4-aminobutyl)-N-ethylisoluminol; Ab, Antibody; ADM, Adriamycin; AFP, Alpha fetoprotein; Ag, Antigen; ALP, Alkaline phosphatase; ATP, Adenosine triphosphate; bbc-DL-DNA, bio-bar-code dendrimer-like DNA; BPE, Biophoton emission; CA, Carcinoma antigen or Carbohydrate antigen or Cancer antigen; CBE, Clinical breast examination; CE, Capillary electrophoresis; CEA, Carcinoembryonic antigen; CL, Chemiluminescence; CLIA, Chemiluminescence immunoassay; CNT, Carbon nanotube; cps, counts per second; CRET, Chemiluminescence resonance energy transfer; CT, Computed topography; CTC, Circulating tumor cell; Cys, Cysteine; Cyfra21-1, Cytokeratin fragment; dNTP, Deoxyribonucleotide triphosphate; DPC, Diperoxidocuprate; DXR, Doxorubicin; DXR-ol, Doxorubicinol; ELISA, Enzyme-linked immunosorbent assay; FCLA, Fluoresceinyl cypridina luciferin analog; FCMSN, Fluorescent and

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