



Proteins as Vanguard: Biomedicine's Revolutionary Role in Cancer Treatment

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The tides of cancer treatment are turning with proteins emerging as a stalwart component of biomedicine, poised to replace conventional chemotherapeutics. This editorial delves into the transformative potential of proteins in the field of biomedicine, highlighting their crucial role in personalized and targeted cancer therapies that hold the key to improved efficacy and reduced side effects. Biomedicine enables precision medicine by tailoring treatments based on the unique genetic makeup of individual patients. Targeted therapies, such as monoclonal antibodies and gene therapies, hold the promise of attacking cancer cells with unprecedented accuracy, minimizing damage to healthy tissues. Monoclonal antibodies, a key class of proteins, epitomize the precision targeting made possible by biomedicine. These engineered proteins seek out specific cancer cells, binding to surface markers with high affinity. This targeted approach minimizes collateral damage to healthy tissues, a notable advantage over the systemic impact of traditional chemotherapeutics [1]. Proteins play a pivotal role in unleashing the power of the immune system through immunotherapy. Checkpoint inhibitors, designed as protein-based drugs, disrupt the signals that cancer cells use to evade immune detection. This reinvigorates the body's natural defense mechanisms, leading to sustained and specific anti-cancer responses [2]. At the forefront of biomedicine, CAR-T cell therapy involves engineering patients' own T cells to express chimeric antigen receptors (CARs), which are essentially protein structures. These receptors enable T cells to recognize and eliminate cancer cells with remarkable precision, showcasing the potential of protein-based therapies in reshaping cancer treatment strategies [3]. Proteins also serve as crucial biomarkers, offering insights into a patient's unique cancer profile. Several proteins are commercially available as biomedicines for cancer treatment. Trastuzumab is monoclonal antibody target the HER2 protein used in breast cancer. Rituximab target the CD20 protein on B cells. Pembrolizumab is an immune checkpoint inhibitor targeting PD-1 protein and used in various cancers, including melanoma, lung cancer, and head and neck cancers. Daratumumab target CD38 protein on myeloma cells and it is approved for the treatment of multiple myeloma. These examples represent a fraction of the protein-based biomedicines available for cancer treatment. As research advances and challenges are met, proteins stand as vanguards in the journey towards replacing chemotherapeutics, offering renewed hope for improved patient outcomes and a paradigm shift in oncological care.

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