

EDITORIAL

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Celebrating World Cancer Day: Innovative Biological Approaches to Cancer and their Alignment with Sustainable Development Goals (SDGs)

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World Cancer Day, observed on the fourth of February, is a global initiative led by the Union for International Cancer Control. It seeks to raise awareness and inspire a collective commitment to reducing cancer rates globally. More than just a date, World Cancer Day represents a unified effort to create positive change toward a future with fewer cancer cases.

Cancer is still one of the top health challenges facing the world, given that it accounts for about one in six deaths worldwide. The challenge posed in the treatment of cancer has sparked interest in ingenious biological interventions that offer improved therapeutic efficacy and are in line with the SDGs, while the reduction of premature mortality from chronic noncommunicable diseases is goal 3.4 of the SDGs [1, 2].

Traditional cancer therapies tend to have an array of untoward side effects and limited efficacy. Therefore, with the increased global burden, there is an urgent need to develop novel treatment modalities that can improve patients' outcomes while keeping the adverse effects at a minimum. Innovative biological approaches can offer promising alternatives by targeting specific pathways. New techniques such as nanomedicines, combination therapies, drug repurposing, and personalized treatments

have effectively focused on the fundamental characteristics of cancer and need to gain more attention [3].

Currently, precision treatment according to the genetic makeup of individual tumors could be very effective. The molecular characteristics of cancer cells can be analyzed by clinicians to identify specific mutations and alterations that drive tumor growth. This allows for a more personalized approach to developing targeted therapies that are more effective and less harmful [4, 5].

Besides, nanomedicine is a novel approach to the delivery and imaging of active pharmaceutical ingredients. It increases the bioavailability of the therapeutic agent with a simultaneous decrease in systemic toxicity. Nanoparticles can be engineered to target a tumor microenvironment with an enhancement of therapeutic action accordingly [6–9].

Combination therapies also emerged as an important strategy for various complex diseases, including cancer. Such therapies can enhance efficacy and mitigate resistance by using multiple agents. This approach exploits synergistic effects and targets various pathways simultaneously, something important given the heterogeneous nature of tumors. Further still, combination therapies may reduce the dose of each drug to be used, hence reducing potential toxicity and side effects. In sum, this multi-faceted approach has the potential to improve treatment outcomes for a wide range of medical conditions [10, 11].

Moreover, drug repurposing or repositioning is a strategy to find new therapeutic uses for already approved drugs. This approach accelerates drug discovery by taking

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medicines with established safety profiles, hence reducing development time and costs drastically. It has also been in the high limelight during urgent healthcare crises, like the COVID-19 pandemic, where finding rapid solutions for a variety of diseases has been highly essential. Generally speaking, drug repurposing is a practical approach in current medicine to meet unmet clinical needs effectively [12, 13].

Additionally, personalized cancer treatments, also referred to as precision medicine, utilize genetic information and tumor profiling to offer therapies that are tailored to the individual. This approach increases the treatment efficacy by targeting the specific genetic alterations within the tumor cells, unlike in traditional ways. However, some challenges continue to face tumors due to their highly heterogeneous nature. In general, it's a breakthrough into a brighter perspective that brings along more efficient therapy with less toxicity for the patient [14–16].

In general, innovative biological approaches to cancer treatment contribute to several SDGs, especially Goal 3: Good Health and Well-being, by improving access to effective treatments with fewer side effects. It is also highly important that sustainability research and development allow for advances in cancer therapy to be available and affordable to various populations. The landscape

of cancer treatment is rapidly changing with innovative biological approaches that promise improved efficacy with reduced toxicity. Nanomedicines, combination therapies, drug repurposing, and personalized treatments represent major advances toward personalized medicine by sustainable development goals. Further research and collaboration across disciplines will be required to overcome the existing challenges in ensuring equitable access to these transformative therapies.

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