The Torch
Vol. 2 (9)

Three-dimensional modelling of cancer stem cells culture: A new trend

Charbel Raad

As cancer incidence and mortality started increasing worldwide, many approaches have been developed to effectively diagnose and treat emerging tumours. Some of these techniques are based on the use of chemotherapeutic agents and irradiations to induce cancer cell death. However, the adoption of these approaches led to several side effects, including the paralysis of organ systems, such as the immune system due to lack of selectivity, which affects normal cells. In addition to the preceding, it has been shown that the remission rates of tumours have been increasing due to cancer cell’s capabilities of self-regeneration, a stem cell characteristic. Based on this similarity in characteristics, research is being conducted to look deeper into the role of cancer stem cells in the proliferation and metastasis of malignancies. Based on this evolving importance of cancer stem cells in tumour diagnosis, a new trend has emerged intertwining cancer biology and tissue engineering. This collaboration has suggested the idea of using biomaterials to generate a three-dimensional model for cultivating cancer stem cells. Biomaterials are actually engineered metabolites created to fulfil research and medical purposes. As a result of this engineered culture environment, it became possible to recreate extracellular matrix components as well as maintaining interactions between different cells, allowing to mimic the in vivo environment in a more representative way, without omitting the surrounding environment actually surrounding cells. As a result, the outcomes of studies based on 3D culture instead of 2D culture will reflect the actual physiology, metabolism, and growth of cancer stem cells better, in addition to a more refined representation of their resistance to chemotherapy, drugs, and other therapeutic approaches. This new technology possesses scope that can forever change the way cancer stem cells are studied, giving researchers the chance to observe the cells in their natural habitat, thus yielding refined outcomes, facilitating the discovery of a new selective oncological drug.

Keywords: Cancer stem cells, 3D culture, Tissue engineering, Biomaterials, In vivo environment

Citation:
Charbel Raad. Three-dimensional modelling of cancer stem cells culture: A new trend. The Torch. 2021. 2(9). Available from: https://www.styvalley.com/pub/magazines/torch/read/three-dimensional-modelling-of-cancer-stem-cells-culture-a-new-trend.