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The synthesis of acetal-free TF antigens for anti-cancer vaccine

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Aljoudi, Abdul Rahman and Sadraei, Seyed Iraj, "The synthesis of acetal-free TF antigens for anti-cancer vaccine" (2020). *UWill Discover Undergraduate Conference*. 13.

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The synthesis of acetal-free TF antigens for anti-cancerous vaccines

Authors: Abdulrahman Aljoudi; Seyed Iraj Sadraei; John F. Trant.

Cancer is one of the most feared diseases in the world in which it is difficultly treated without close attention. This is because it is hard to synthesize agents that could detect and invade these cells. Among all the therapies that was developed to treat this mortal disease, including chemotherapy, hormone therapy and radiation therapy, the only best treatment with the least adverse and fatalistic effects is the immunotherapy in which it assist in boosting the immune system to specifically target the cancerous cells. Even though the immune system has evolved over the years to detect and eliminate any viral or non-viral (bacterial) infections, they are hard to detect cancerous cells without any assistance, because they were originally healthy, normal cells that have transformed into pathogenic cells through mutations, thus they are hard to be differentiated. However, on the surface of these cancer cells, they compose a distinct, complex component, a tumor associated carbohydrate antigens (TACAs) that differentiate them from normal, healthy adult tissues. Therefore, the main focus of this project is to synthesize anti-cancer vaccine, which is mainly composed of acetyl-free carbohydrates, that could instruct the immune system to recognize and target specifically the cancerous cells. Unfortunately, not all carbohydrates have the ability to target cells because they are sensitive to enzymatic process and are capable to degrade at different environmental conditions. So, the best option is to remove the acetyl group in the carbohydrate by exchanging the exocyclic oxygen with a methyl group (C-glycoside) to synthesize an acetyl-free C-glycoside which is identical to the TF-antigen found primarily and solitary in cancerous cells. This presentation will discuss about the manifestation and the synthesize of acetyl-free carbohydrates on the invasion of cancerous cells.