Developing a Radioimmunotherapy for Synovial Sarcoma

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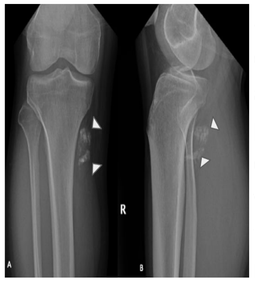
Purpose

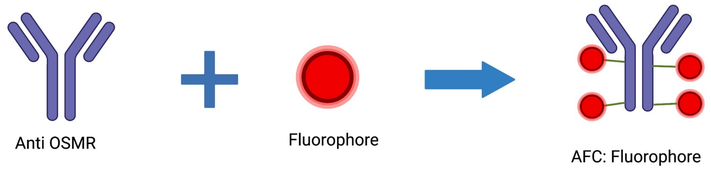


Synovial sarcoma is a rare form of cancer that occurs in the soft tissue adjacent to bones in adolescents and young adults. This cancer is poorly understood due to limited studies on the disease, resulting in poor prognosis, especially when metastasis has occurred. The current treatment options for this cancer are surgery, radiation, and chemotherapy.

Unfortunately, by the time the cancer is usually diagnosed metastasis has already occurred, leaving radiation and chemotherapy as the only options and these tend to have severe side effects. In this work, we sought to develop a new noninvasive radioimmunotherapy for the treatment, diagnosis (theranostic), and monitoring of synovial sarcoma with limited side effects by targeting Oncostatin M Receptor (OSMR). Oncostatin M Receptor (OSMR), is a receptor that when activated by its ligand Oncostatin M(OSM), has been shown to be involved in cancer proliferation and migration and to be highly expressed in various cancers including synovial sarcoma. We hypothesized that by targeting OSMR we will be able to develop a noninvasive radioimmunotherapy for synovial sarcoma.

Methods

In this work, we conjugated an anti-OSMR antibody with a fluorophore to determine the possibility of using an anti-OSMR radioimmunoconjugate as a therapeutic option for this cancer. We then conjugated the anti-Osmr in two methods, stochastically and site-specifically, in order to determine the best method of conjugation.



Results

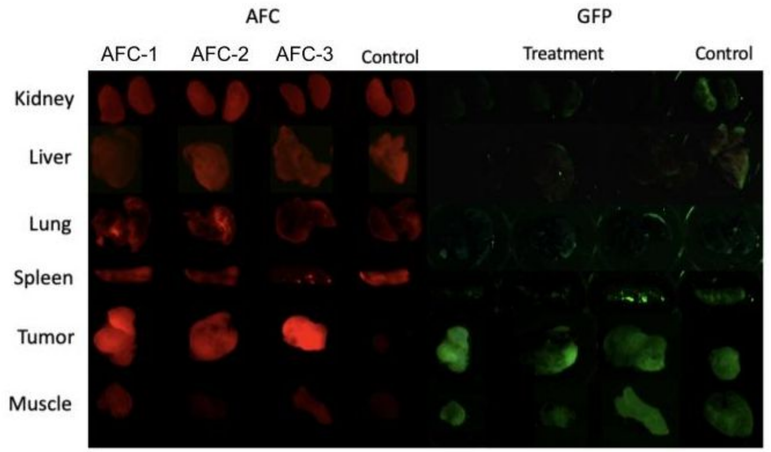


Figure 1. Biodistribution of antibody-fluorophore conjugate(AFC) in Synovial sarcoma mice model.

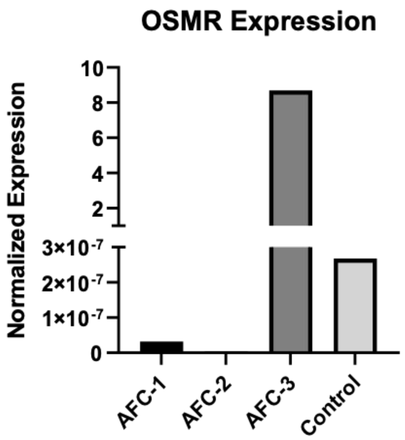


Figure 2. RTqPCR data of Normalized mRNA expression of OSMR in Tumor and control sample

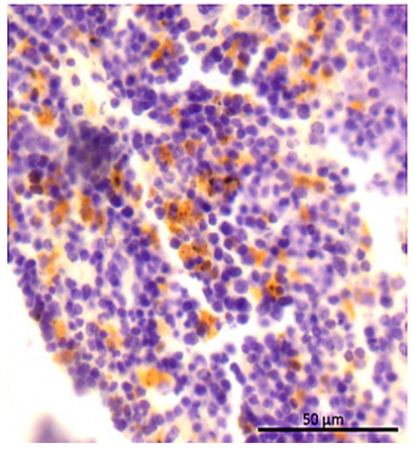


Figure 3. Immunohistochemistry stain of Spleen

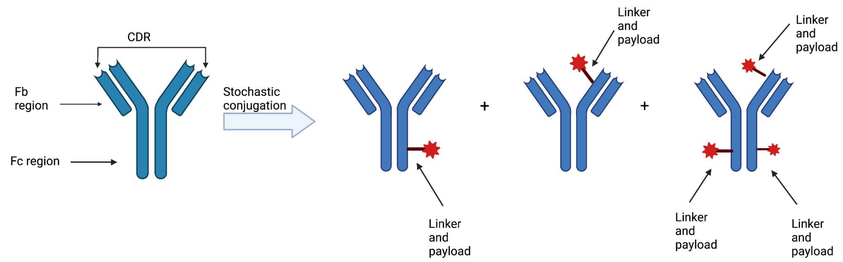


Figure 4. Stochastic conjugation of monocolonal antibody

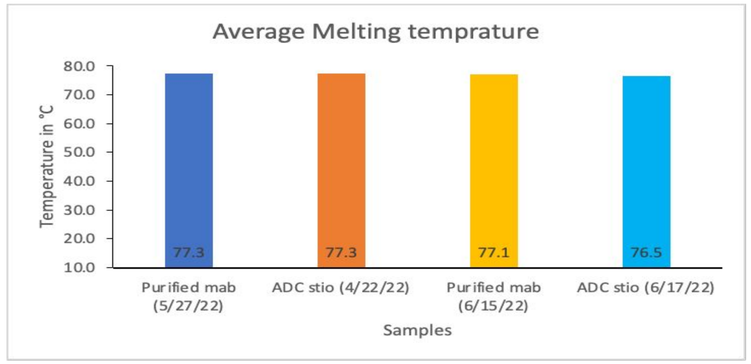


Figure 5. Average melting temperature of purified monoclonal antibodies(purified mab) and stochastically conjugated antibodies(ADC stio) p-value > 0.05

Conclusion

An anti-OSMR conjugate can be used in developing radioimmunotherapy for synovial sarcoma and by exploring the two methods of conjugation, we will be able to develop a novel radioimmunoconjugate for synovial sarcoma.

References

1. Gazendam AM, Popovic S, Munir S, Parasu N, Wilson D, Ghert M. Synovial Sarcoma: A Clinical Review. Current Oncology. 2021 Jun;28(3):1909–20.
2. McCollum S, Kalivas A, Kirkham M, Kunz K, Okojie J, Pavek A, et al. Oncostatin M Receptor as a Therapeutic Target for Radioimmune Therapy in Synovial Sarcoma. Pharmaceuticals (Basel). 2022 May 24;15(6):650.