Targeting Peptides for Treatment of Hematological Cancers

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Over 1.5 million people in the US are living with hematological cancers, of which the treatment options are often chemotherapy or radiotherapy. Targeted cancer treatments are important in efforts to reduce the adverse side effects observed with existing treatments. CD38 is a ubiquitously expressed surface marker found on many hematological malignancies. In this study, we hypothesized that CD38-targeting peptides could be used to deliver therapeutics specifically to human hematological cancer cell lines. To evaluate this, I first conducted therapeutic window experiments using only the targeting peptides to assess their cytotoxicity. I then performed binding assays with FAM-labeled targeting peptides to determine their affinity for CD38-expressing cells. Next, I tested the cytotoxicity of these targeting peptides when conjugated to a therapeutic peptide our lab had done multiple works with (POSH3.3A-Tat), across a panel of hematological cancer cell lines with varying levels of CD38 expression—namely, MM.1S (multiple myeloma), NALM-6 (B-cell acute lymphoblastic leukemia), and Ramos (Burkitt lymphoma). My results showed that the CD38-targeting peptide SL022 was not toxic to MM.1S cells and exhibited strong binding affinity. However, when conjugated with POSH3.3A-Tat, SL022 did not enhance the cytotoxicity of the therapeutic, despite increasing its binding to target cells. Nonetheless, these findings are promising, as they demonstrate that targeting peptides like SL022 can be non-toxic while retaining high specificity and affinity for target cancer cells.