Investigating the Theranostic Potential of Antibody X Against Small Cell Lung Cancer

Ma, Maxwell (School: Irvington High School)

Small cell lung cancer (SCLC) is an extremely aggressive form of lung cancer with a less than 5% five-year survival rate. The poor prognosis is mainly attributed to the lack of effective, low toxicity treatments that can produce sustained responses in patients. To address this unmet medical need, a precise drug for treating SCLC was developed in this study. Delta-like ligand 3 (DLL3), a receptor exclusively expressed on the cell membrane of SCLC, was targeted with a radioimmunoconjugate. The drug was synthesized by radiolabeling the novel anti-DLL3 Antibody X with therapeutic Lutetium-177, and the compound was assessed against the NCI-H82 SCLC cell line. The SDS-PAGE revealed a single band of highly stable radioimmunoconjugate, and the instant thin-layer chromatography showed high purity (95.2%). Furthermore, the cell binding assay demonstrated the drug's high cell binding affinity to DLL3 ($p=0.0071$). Based on these findings, the study concluded that the radioimmunoconjugate has high stability, high purity, high binding affinity, and high specificity to SCLC. Antibody X shows enormous potential in both SCLC therapy and a new treatment method, theranostics. Theranostics is a budding innovative field that combines therapeutics and diagnostics to provide physicians a method of accurately predicting patient response to therapy. Antibody X has strong potential to become a game-changing SCLC treatment and one of the first radioimmunoconjugates in theranostics, offering new hope to patients with SCLC.

Awards Won:
Third Award of $1,000