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Screening and identification of an aptamer to the HL-60 cell line of acute promyelocytic leukemia from a specific human ssDNA library

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APL is the most curable form of AML due to its sensitivity to ATRA, but challenges due to the threat of DIC at diagnosis and drug toxicity of combination therapies during treatment, still remain. The aim of this study was to generate information on a newly selected group of ssDNA aptamer candidates and build a potential aptamer library, for future use and reference in improving diagnostic and therapeutic efficacy in APL management. This study involved the amplification of 7 highly specific ssDNA sequences of 39-40bp each flanked by an 18bp primer sequence on both 5' and 3' ends. DNA was cloned into DH5α cells and ssDNA obtained by affinity chromatography, purified and quantified by spectrophotometry. Cell binding affinity assays were conducted with APL HL-60 cells at room temperature, with incubation at 37 ^{0}c. Results were quantified by spectrophotometry. Quality and yield of PCR amplified DNA was dependent on concentration of plasmid template in the PCR mix and the number of cycles employed. It was realized that DNA purification using Phenol-chloroform was most effective when plasmid templates used were freshly extracted and hadn't been subjected to prolonged storage. Of the 7 DNA sequences tested, sequences 135, 57 and 2 were observed to have the highest affinities and 59, the lowest. Sequences 135 and 2, on statistical analysis demonstrated the highest affinities and are deemed ideal candidates for further investigation in the development of effective aptamers and other tools for timely diagnosis and effective management of APL. We suggested that further research be done.

Biography

Nabusige Jean Brenda Gesa is a dedicated scholar of Hematology and Oncology, passionate about healthcare advancement in Uganda and proficient in at least 3 languages, including English and Mandarin Chinese. She received her Bachelors' degree in Biomedical Laboratory Technology from Makerere University, Kampala and a Master of Medicine in Clinical Laboratory Diagnostics at Beihua University, China (2017). She also acquired diagnostic laboratory experience at St. Raphael of St. Francis Hospital, Nsambya in Kampala and Jilin Central Hospital, China. Her research interests include environmental pollutants in relation to hematological malignancies and hematological cancer research; diagnostics and therapeutics.

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