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Signal Transducer and Activator of Transcription 3 (*STAT3*) Gene Expression Analysis in Gastric Cancer Cell Lines

Nor Athirah Abdul Khalil[a], Maslinda Musa[ab*]

Structured Abstract

Background Signal Transducer and Activator of Transcription 3 (*STAT3*) function to regulates expression of the genes associated with cell growth, proliferation, inflammatory responses and cell death. Numerous studies have demonstrated that dysregulation of *STAT3* expression contributed to the pathogenesis and progression of various cancers, including gastric cancer. Overexpression of phosphorylated *STAT3* increased cell proliferation and resistance to cell death in cancer cells. In this study, analysis on the *STAT3* gene expression was done *in vitro* utilizing two human gastric cancer cell lines consisting of AGS (CRL-1739), and HGC-27 (RCB0500).

Methods: Total RNA was extracted from these cells followed by quantitation of total RNA, formaldehyde agarose gel electrophoresis to determine the RNA integrity. Expression analysis was done by reverse transcriptase quantitative real-time PCR (qRT-PCR) using gene specific primers representing *β-ACTIN* as the reference gene. The data were analysed using the comparative Delta Ct method (ΔCt) to determine the relative expression of the *STAT3* against *β-ACTIN*.

Results: The findings indicate, *STAT3* gene was detected in AGS and HGC-27 cells. After normalization to reference *β-ACTIN* gene, quantitative analysis shows that AGS cells have lower ΔCq values (6.3263) compared to HGC-27 cells (7.4163). This result indicates that *STAT3* is up-regulated in AGS cells as compared to the HGC-27 cells. A two-sample *t-test* revealed that the difference in ΔCq between the two cell lines was statistically significant ($p = 0.0335$, $p < 0.05$). Verification of the qRT-PCR data using gel electrophoresis confirmed that *STAT3* gene is highly expressed in AGS in contrast to HGC-27 indicating up-regulation.

Conclusion: In conclusion, *STAT3* expression was found in both AGS and HGC-27 tested with higher expression in AGS cells. For future studies, it is suggested that a more comprehensive profiling on *STAT3* and its post translational modification status to be carried out to elucidate its role in gastric cancer and potential use as a biomarker and therapeutic target.

Keywords: *STAT3*, gastric cancer, AGS, HGC-27, qRT-PCR

*Correspondence: Maslinda64@uitm.edu.my

[a] School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

[b] Centre of Chemical Synthesis and Polymer Technology (CCSPT), Institute of Science, Universiti Teknologi MARA, Malaysia