

Expression Analysis of Platelet-Derived Growth Factor Receptor Alpha in Pre- and Post-Menopausal Breast Cancer in Sri Lanka

S. Branavan¹, W.R.P. Wijesinghe¹, E. Siriweera², H. Sandareka², D.H. Beligala³,
S.P. Kodithuwakku^{4*}

¹*Department of Botany, University of Peradeniya, Peradeniya, 20400, Sri Lanka*

²*Department of Pathology, University of Peradeniya, Peradeniya, 20400, Sri Lanka*

³*Department of Neurology, University of Toledo, Toledo, OH 43606, United States*

⁴*Department of Animal Science, University of Peradeniya, Peradeniya, 20400, Sri Lanka*

**surangap@agri.pdn.ac.lk*

Breast cancer, a leading cause of death among women worldwide, including in Sri Lanka, involves angiogenesis regulated by factors like vascular endothelial growth factor and platelet-derived growth factor (PDGF). PDGF signaling components, especially PDGFRA and PDGF-CC, are linked to triple-negative breast cancer. Notably, PDGF-CC expression is also influenced by menopausal status. Therefore, this study was conducted to determine the differential expression of the PDGFRA gene in pre- and post-menopausal breast cancer patients in Sri Lanka and to assess the possibility of using it as a prognostic genetic marker. Initially, the total RNA was extracted from the breast cancer tissues of 50 premenopausal and postmenopausal patients using the TRIzol method. RNA quality and concentrations were measured using a NanoDrop spectrophotometer. Subsequently, the cDNA was synthesized using the GoScript™ Reverse Transcription System, and the successful transcription was confirmed through a PCR and agarose gel electrophoresis. The expression levels of the PDGFRA gene in pre- and post-menopausal breast cancer tissues were quantified by conducting an RT-qPCR with 18S rRNA as the reference gene. Then the relative expression levels were calculated and analyzed using the Mann-Whitney test in GraphPad Prism 10.4.1. All RNA samples had an A260/A280 ratio of 1.7–2.1 and concentrations above 50 ng/μL, ensuring reliable cDNA synthesis and gene expression analysis. The expression analysis of the PDGFRA gene in premenopausal and postmenopausal breast cancer tissues revealed no statistically significant difference between the two groups ($P = 0.632$). Although the median expression was higher in postmenopausal patients (9.309) compared to premenopausal patients (6.551), the difference (Hodges-Lehmann = 1.532) was not significant. These results indicate that PDGFRA expression does not significantly vary between menopausal groups, suggesting it may not serve as a reliable prognostic marker for distinguishing premenopausal and postmenopausal breast cancer. Therefore, further research with a larger sample size and protein level expression is necessary to explore it as a better prognostic indicator in breast cancer patients.

Keywords: Breast cancer genes, RT-qPCR, prognostic markers, *PDGFRA* expression

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