

Silencing of novel TtVtg6-like induced ovarian cell apoptosis in ancient chelicerate *Tachypleus tridentatus*

ABSTRACT

Vitellogenin (Vtg) serves as the precursor of yolk protein and exhibits widespread distribution in tissues, including in the ovary of both vertebrates and invertebrates. Vtg plays a critical role in facilitating oocyte maturation and embryonic development following oviposition. In this study, we have successfully elucidated the complete transcript sequence of TtVtg6-like from an ancient chelicerate *Tachypleus tridentatus*. The TtVtg6-like transcript encompassed a length of 4887 bp and encoded 1629 amino acids residues. Notably, TtVtg6-like was found to contain 25 exons. Furthermore, the molecular weight and isoelectric point of TtVtg6-like were determined to be 191.6 KDa and 6.73, respectively. Subsequent mRNA expression analysis demonstrated the specific expression of TtVtg6-like in ovary and yellow connective tissue. In addition, TtVtg6-like was located and distributed in both ovary and yellow connective tissue. Intriguingly, employing an siRNA approach to silence TtVtg6-like resulted in a decrease in TtVtg6-like transcription levels. Concomitantly, TtVtg6-like silencing led to increase production of ROS, ultimately resulting in DNA damage and cell apoptosis within the ovarian primary cell. The induction of apoptosis ovarian primary cells due to TtVtg6-like silencing was further corroborated through TUNEL assay and flow cytometry analysis. Overall, our findings underscore the significance of TtVtg6-like in ovarian cell development, revealing its potential association with ovarian cell apoptosis. Consequently, the insights gained from this study contribute to the future exploration of vitellogenesis and ovarian development in *T. tridentatus*.