Effect of Vascular Endothelial Growth Factor 165_a and 165_b on Porcine Primordial Follicle Viability *Invitro*

Manjula P.S. Magamage[a], D.N.N. Madushanka[b] and W.R.A.S. Mayurawansha[a]

[a] *Department of Livestock Production, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*
[b] *Faculty of Graduate Studies, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*
manjula.magamage@fulbrightmail.org

Understanding how oocyte morphogens regulate folliculogenesis and how their actions and interactions are integrated into the overall processes in physiology and pathophysiology of reproductive systems of mammals is an existing challenge. Growth of an oocyte in mammal starts with an avascular structure called a 'primordial follicle' and subsequent to ovulation this avascular structure transforms into a heavily vascular corpus luteum. This primordial follicle activation is a complex process and it is not yet completely understood. Vascular endothelial growth factor (VEGF) is well-known for its ability to regulate angiogenesis from the existing blood vessels. Studies on VEGF play a pivotal role in understanding the primordial follicle activation and progression of their growth. The objective of the current study was to determine the effect of $VEGF_{165a}$ and $VEGF_{165b}$ on porcine primordial follicle development *invitro*. $VEGF_{165a}$ is known to be a pro-angiogenic factor where $VEGF_{165b}$ is anti-angiogenic. The tissue samples were treated with $VEGF_{165a}$ and $VEGF_{165b}$ with 0ng/ml, 0.1, 1.0, 10.0 ng/ml and the day 0 (Negative control) sample was fixed in 10% neutral buffered formalin instantly. The preliminary data were obtained from short-term (72 hours) *in vitro* culture of porcine ovarian cortical stripes and tissues were incubated under 5% CO_2 with the humidified atmospheric conditions at 37.5^0C. Out of three different dose regimes in $VEGF_{165a}$ treated tissues, 0.1ng/ml resulted in the highest viable follicle count (92.6%) while 1.0ng/ml and 10ng/ml had shown 65.3% and 24.8% viable follicle count, respectively. The highest $VEGF_{165a}$ concentration recorded the highest follicle degeneration. Among the $VEGF_{165b}$ treated tissues, 0.1ng/ml, 1.0ng/ml and 10.0ng/ml have shown 65.3%, 43.7%, 17.3% follicle viability respectively. As $VEGF_{165b}$ is an anti-angiogenic factor, it contributed to the increase follicular degeneration in all treatments. It showed a pattern of follicle degeneration where higher concentrations had accelerated the follicle degeneration. In conclusion it was evident that the lowest $VEGF_{165a}$ concentration (0.1ng/ml) improved the follicular viability, where 1 and 10ng/ml $VEGF_{165a}$ increased the follicular degeneration. Also $VEGF_{165b}$ has a negative effect on follicular viability *in-vitro.* In animal's body both $VEGF_{165a}$ and $VEGF_{165b}$ coexist while showing equilibrium. It needs to be further investigated to find the ideal concentrations of $VEGF_{165a}$ and $VEGF_{165b}$ that promote cell viability *in vitro.*

Keywords: angiogenic factor, follicle activation, porcine primordial follicle, $VEGF_{165}$