

Quantitative morphometric analysis of the angiogenic effects of tocopherols on utero-placental vascular network of late pregnant ewes

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We measured angiogenic activity of tocopherol by digital morphometry and computer assisted image analysis. Histological images obtained from placentomes of late pregnant ewes supplemented with alpha-tocopherol (n=6; 500 mg orally) or gamma-tocopherol (n=7; 1000 mg orally) or a placebo (n=5) were compared. Image processing and analysis were performed using ImageJ 1.42q (NIH, USA) to evaluate the fractal dimension and lacunarity. ImageScope version 10.0 (Aperio Technologies Inc., Vista, CA 92081) was used to evaluate the positivity (# of positive pixel/total). Increased fractal dimension, decreased lacunarity and increased positivity are measures of increased vascularization. Kruskal-Wallis analysis was used to compare the differences between treatment groups.

Results showed that placentomes obtained from alpha-tocopherol or gamma-tocopherol treated ewes had a significant increase in fractal dimension ($P<0.05$) and had a significant decrease in lacunarity ($P<0.05$) and pixel positivity ($P<0.05$) compared to placebo treated ewes.

In conclusion, pregnant ewes supplemented with gamma- or alpha-tocopherol showed increased angiogenesis in utero-placental units. These results underscore the importance of using multiparametric quantitative methods to assess several aspects of angiogenesis and to further the understanding of the pro-angiogenic effects of tocopherol.