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**Topic: Effect of Cinnamon Extract on Angiogenesis and Cyclooxygenase in Multiple Myeloma**

### **ABSTRACT**

In this study, we have explored the expression of the angiopoietin system in MM patients and evaluated its potential correlation with cyclooxygenase and other established angiogenic factors (VEGF and HGF) alongwith severity of the disease. This is the first study to investigate the anti-cancer potential of cinnamon bark powder extract (CBPE) on myeloma cells (RPMI8226) specifically focusing on its anti-angiogenic and anti-inflammatory properties. By taken into account that inflammation and angiogenesis plays an important role in MM, we have observed the inhibition of myeloma cell proliferation by CBPE alongwith anti-inflammatory and anti-angiogenic effects, from *Cinnamomum cassia* L. family Lauraceae, in a human myeloma cell line, RPMI8226.

The present study encompasses the following findings:

- Significantly higher circulatory and cellular levels of Ang-2, HGF, and VEGF were observed, whereas Ang-1 serum levels show insignificant increase, but mRNA levels were elevated significantly.
- Increase in enzyme activity in PBMC as well as expression (mRNA, Protein) of COX-2 was observed which also shows correlation with the sternness of the disease. COX-1 activity got reduced, whereas mRNA and protein levels were elevated.

- Strong correlation between VEGF and HGF expression was observed along with severity of the disease. Significant correlation found between Ang-2 and VEGF might add some light on the induction of neoangiogenesis, synergistically.
- CBPE extract significantly affected growth rate of RPMI8226 cells in a dose dependent manner and suppression of DNA synthesis was also observed. CBPE induces apoptosis as evident from DNA fragmentation (TUNEL). Significant decrease of angiogenic factors and cyclooxygenase levels were observed at mRNA and protein level.

The strong association between angiogenic factors and cyclooxygenase observed in this study may lead to the development of new combinational therapeutic strategies to treat the MM patients. This study provides an insight in understanding how these multiple classes of factors harmonize to provide a microenvironment which helps in the augmentation and propagation of cancer cells. In summary, antitumor effects of cinnamon extract appear to be mediated by multiple mechanisms. These include inhibition of angiogenesis, inflammation and apoptosis induction in myeloma cells. Hence, CBPE could lead to development of potent anti-tumor agent or complementary and alternative medicines for the treatment of MM. Further research is needed to determine the major active components responsible for CBPE anti-angiogenic and anti-inflammatory activity and to address which signaling pathways are involved. As a natural inhibitor of angiogenesis and inflammation, CBPE has the potential to be routine diet based strategy for cancer prevention or treatment.