Androgen signaling, mediated by binding of androgen to the androgen receptor (AR), plays a critical role in the development and progression of prostate cancer. Testosterone (T) is the main androgen in circulation. It is converted to the more potent androgen dihydrotestosterone (DHT) in the prostate by 5α-reductase. The Prostate Cancer Prevention Trial (PCPT) showed finasteride, an inhibitor of 5α-reductase, reduced prostate cancer risk by 25% in an average-risk cohort. Emodin is a naturally occurring anthraquinone that has been shown to suppress the expression of AR and inhibit the growth of prostate cancer cells. Based on these previous findings, we hypothesize that emodin and finasteride synergize on androgen signaling blockade and tumor inhibition.

Using androgen-dependent prostate cancer cell line LNCaP, we demonstrated that the combination of emodin and finasteride inhibited the transcriptional activity of AR and the expression of androgen-regulated genes more significantly than either agent alone, suggesting that these agents synergize on suppressing the androgen signaling pathway. In addition, these agents acted in concert to inhibit the growth of LNCaP cells. The synergy in growth inhibition is likely to be mediated by the complementary actions of these agents on cell cycle arrest at the G1 phase, on DNA synthesis inhibition, and on cell death induction. In summary, these findings suggest a novel combination strategy for androgen signaling blockade in prostate cancer intervention.