Chinese red yeast rice versus lovastatin effects on prostate cancer cells with and without androgen receptor overexpression.

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Abstract

Chinese red yeast rice (RYR), a food herb made by fermenting Monascus purpureus Went yeast on white rice, contains a mixture of eight different monacolins that inhibit cholesterogenesis and also red pigments with antioxidant properties. Monacolin K (MK) is identical to lovastatin (LV). Both LV and RYR contain statins, which could inhibit de novo cholesterogenesis, which is critical to the growth of tumor cells. Dysregulation of the cholesterol biosynthetic pathway has been demonstrated during progression to androgen independence in xenograft models, and it has been proposed that cholesterogenesis and androgen receptor (AR) up-regulation are essential to androgen-independent cell survival. This study was designed to examine the differences between the effects of RYR and LV on androgen-dependent LNCaP cells and androgen-independent cells overexpressing AR (LNCaP-AR). RYR showed more potent inhibition effect on prostate cancer cell growth compared to LV. Both the pigment and monacolin-enriched fractions purified from RYR inhibited proliferation (P < .001) to a lesser extent than intact RYR. While mevalonate, an inhibitor of 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR), restored proliferation in LV-treated cells, it failed to do so in RYR-treated cells. Expression of the HMGCR gene was up-regulated by LV (P < .001) but not RYR in both LNCaP and LNCaP-AR cells. These results suggest that the RYR matrix beyond MK alone may be bioactive in inhibiting androgen-dependent and -independent prostate cancer growth. In vivo studies are needed to further establish the potential advantages of RYR over LV in prostate cancer chemoprevention and in the prevention of the emergence of androgen independence.

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