The RNASEL gene, a strong candidate for the hereditary prostate cancer 1 (HPC1) allele, encodes a single-stranded specific endoribonuclease which induces apoptosis. The R462Q missense mutation of HPC1 has been implicated as a susceptibility locus in up to 13% of unselected prostate cancers and occurs as a somatic mutation in 40% of human prostate cancer.

We have shown that the R462Q missense variant of RNaseL is associated with defective apoptosis in human prostate cancer because of reduced enzymatic activity, and that RNaseL knockout mice are more prone to infections. In conjunction with other data suggesting multiple defects in the ability of human prostate cancer to defend against oxidative stress, a model of chronic infection leading to chronic inflammation as a cause of prostate cancer will be presented. The rationale for the use of antioxidants such as selenium and vitamin E as chemopreventative agents, and the design of the Selenium and Vitamin E Cancer Prevention trial (SELECT) will be discussed.