Lower urinary tract syndrome (LUTS) is characterized by symptoms of overactive bladder, urinary incompetence and has long been considered an indicator for prostate cancer. Unfortunately, using only LUTS as an indicator yields a very high false positive rate (64%) and “findings suggest that lower urinary tract symptoms are not highly predictive of prostate cancer (2).” Prostate cancer is an ideal disease to study through LUTS symptomatic patients for pre-cancerous indicators because it progresses slowly indicated by a 5-year survival rate of 96% (2). At UMASS Boston’s Center for Personalized Cancer Treatment, a comparative analysis of RNA-sequence data from symptomatic LUTS patients and asymptomatic subjects indicated differential expression of the COL1A1 gene. Although the analysis determined many differentially expressed genes, Professor Macoska’s team was particularly interested in the COL1A1 gene.

COL1A1 is a gene contained in the Refseq’s human genome (hg38) assembly of chromosome 17 connected to accession number NC\_000017.11. The COL1A1 gene sequence is contained in the RefSeq gene database connected to accession number NG\_007400.1. There are curated mRNA and protein sequences for theCOL1A1 genes connected to accession numbers [NM\_000088.3](http://www.ncbi.nlm.nih.gov/nuccore/NM_000088.3) and [NP\_000079.2](http://www.ncbi.nlm.nih.gov/protein/NP_000079.2) respectively. The COL1A1 gene codes for a 1464 amino acids collagen alpha-1(I) chains. These chains combine with alpha 2 chain in a 2:1 ratio to form Type I collagen in a triple helical structure. Type I collagen is a structural protein that is abundantly found in bones, tendons, ligaments, and epithelial tissue (1). Mutations in the gene can result in disordered bone formation and bone degeneration manifested in many diseases (osteogenesis imperfecta, types I-IV, Ehlers-Danlos syndrome type VIIA, Ehlers-Danlos, syndrome Classical type, and Caffey Disease) (1). Meiotic events between the COL1A1 gene and the platelet-derived growth factor beta gene on chromosome 22 have been linked to a form of skin cancer (dermatofibrosarcoma protuberans) (1). Further analysis of the gene interactions of COL1A1 may prove useful in the quest for early detection and treatment of prostate cancer

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