ANNOTATED MOLECULAR INTERACTIONS OF THE KALLIKREIN-RELATED PEPTIDASE GENE FAMILY

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Abstract: We previously observed that KLK7, a member the Kallikrein-Related Peptidase gene family had 6 vicinal cysteines that can potentially interact with arsenic, an environmental toxicant. At least 15 human homologs of the KLK gene family are known. The objectives of this study were to (i) extract functional annotation information on KLK7; and (2) compare the molecular interaction annotations of the KLK gene family in the Michigan Molecular Interaction database. We hypothesize that members with single interaction could indicate gene-specific interactions. Kallikrein-Related Peptidase 7 has multiple names, which include KLK7, stratum corneum chymotrytic enzyme (SCCE), and PRSS6. It is a secreted protein which belongs to the S1 family and the Kallikrein subfamily. KLK7 is associated with various cancers such as prostate, ovarian, and breast cancer and consists of 253 amino acids. The KLK7 protein is located in the extracellular region of the cell and has two biological processes annotation: the epidermis development and proteolysis. The epidermis development is a biological process whose specific outcome is the progression of the epidermis over time from its formation to the mature structure and proteolysis is the chemical reactions and pathways resulting in the breakdown of a protein by the destruction of the native, active configuration with the hydrolysis. Its molecular function is of the serine-type endopeptidase activity. This activity is the catalysis of the hydrolysis of internal, alpha-peptide bonds in a polypeptide chain by a catalytic mechanism that involves a catalytic triad consisting of a serine nucleophile that is activated by a proton relay involving an acidic and basic residue. KLK7 is located on chromosome 19. It is composed of five coding exons and four intervening introns with a conserved intron phase pattern. Originally purified in human skin, KLK7 is expressed in a wide range of tissues at low to high levels; although modest levels have been detected in body fluid such as breast milk. In normal skin, it has been expressed in late epidermal differentiation and it was detected in a population of dendritic cells and in high suprabasal keratinocytes. The interaction counts reported when present were 1, 2, 3, 13. KLK4 and KLK7 had only one annotated interaction with sex hormone-binding globulin (SHBG) and corneodesmosin (CDSN) respectively.

Keywords: arsenic, KLK, keratinocytes, MIMi Web, protein-protein interactions, skin

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