Genetic Mutations and Associated Conditions

#	Gene / Mutation	Associated Condition(s)	Notes
1	**GNAS1**	Fibrous Dysplasia	Affects cAMP-mediated osteoblast differentiation
2	**HLA-B27**	Ankylosing Spondylitis, Seronegative Spondyloarthropathies	Strong genetic association
3	**CTNNB1 (β-catenin)**	Deep Fibromatoses (Desmoid Tumor)	Activates Wnt signaling pathway
4	**APC**	Familial Adenomatous Polyposis (FAP), Gardner Syndrome, Deep Fibromatoses	Tumor suppressor gene; activates Wnt pathway
5	**MYH9-USP6 (t(17;22))**	Nodular Fasciitis	Fusion gene; indicates clonal neoplastic origin
6	**T(1;2)(p13;q37)**	Tenosynovial Giant Cell Tumor (PVNS)	Affects collagen type VI α3
7	**MDM2 amplification (Chr 12)**	Well-Differentiated Liposarcoma	Common in retroperitoneal tumors
8	**T(12;16)**	Myxoid Liposarcoma	Translocation characteristic of this subtype
9	**Complex Karyotype**	Pleomorphic Liposarcoma	No specific mutation; multiple chromosomal abnormalities
10	**T(X;18)(p11;q11)**	Synovial Sarcoma	Fusion gene SS18; detected by FISH
11	**Fumarate Hydratase (Chr 1q42.3)**	Leiomyoma	Low diagnostic value; seen in some cases
12	**BRAF / RAS**	Benign Nevus, Dysplastic Nevus, Melanoma	Early mutations in melanocytic tumors
13	**TP53 / PTEN / TERT**	Melanoma (advanced stages)	Late mutations during malignant progression
14	**TP53**	Actinic Keratosis, SCC, Basal Cell Carcinoma	Common UV-induced mutation
15	**FGFR3**	Seborrheic Keratosis	Benign skin tumor; different pathogenesis
16	**PTCH1**	Basal Cell Carcinoma, Gorlin Syndrome (Basal Cell Nevus Syndrome)	Hedgehog pathway mutation