

Appendix

Table 1. List of 120 measure quantitative tissue pathology (QTP) features

Phenotypes	Category	Sub-category	QTP Feature Name*
Nuclear	Morphology		Area (mean/stdv)
Nuclear	Morphology		Mean_radius (mean/stdv)
Nuclear	Morphology		Max_radisu (mean/stdv)
Nuclear	Morphology		Var_radius (mean/stdv)
Nuclear	Morphology		Sphericity (mean/stdv)
Nuclear	Morphology		Eccentricity (mean/stdv)
Nuclear	Morphology		Freq_low_fft (mean/stdv)
Nuclear	Morphology		Freq_high_fft (mean/stdv)
Nuclear	Morphology		Harmon01 (mean/stdv)
Nuclear	Morphology		Harmon02 (mean/stdv)
Nuclear	Optical Density		Dna_index (mean/stdv)
Nuclear	Optical Density		Od_maximum (mean/stdv)
Nuclear	Optical Density		Od_variance (mean/stdv)
Nuclear	Optical Density		Od_skewness (mean/stdv)
Nuclear	Optical Density		Od_kurtosis (mean/stdv)
Nuclear	Optical Density		Var_intensity (mean/stdv)
Nuclear	Chromatin Texture	Fractal Texture	Fractal_dimen (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Short_runs1 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Short_runs2 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Long_runs1 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Long_runs2 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Gray_level1 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Gray_level2 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Run_length1 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Run_length2 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Run_percent1 (mean/stdv)
Nuclear	Chromatin Texture	Run Length	Run_percent2 (mean/stdv)
Nuclear	Chromatin Texture	Markovian Texture	Entropy (mean/stdv)
Nuclear	Chromatin Texture	Markovian Texture	Energy (mean/stdv)
Nuclear	Chromatin Texture	Markovian Texture	Correlation (mean/stdv)
Nuclear	Chromatin Texture	Markovian Texture	Contrast (mean/stdv)
Nuclear	Chromatin Texture	Markovian Texture	Homogeneity (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowdnaarea (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Meddnaarea (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Hidnaarea (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowdnaamnt (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Meddnaamnt (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Hidnaamnt (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowdnacomp (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Meddnacomp (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Hidnacomp (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Mhdnacomp (mean/stdv)

Nuclear	Chromatin Texture	Discrete Texture	Low_av_dst (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Med_av_dst (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Hi_av_dst (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Mh_av_dst (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowvsmed_dna (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowvshigh_dna (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Lowvsmh_dna (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Low_den_obj (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	Med_den_obj (mean/stdv)
Nuclear	Chromatin Texture	Discrete Texture	High_den_obj (mean/stdv)
Tissue Architecture	Voronoi tessellation	Density	Density (mean/stdv)
Tissue Architecture	Voronoi tessellation	VorArea	VorArea (mean/stdv)
Tissue Architecture	Voronoi tessellation	VorPeri	VorPeri (mean/stdv)
Tissue Architecture	Voronoi tessellation	VorRF	VorRF (mean/stdv)
Tissue Architecture	Delaunay Triangulation	DelNeiNb	DelNeiNb (mean/stdv)
Tissue Architecture	Delaunay Triangulation	NeaNei	NeaNei (mean/stdv)
Tissue Architecture	Delaunay Triangulation	DelNeaNei	DelNeaNei (mean/stdv)
Tissue Architecture	Delaunay Triangulation	Del3NeiDist	Del3NeiDist (mean/stdv)

*Each feature category or sub-category is described in its mean and variance.