Some batches (e.g., Batch 3) contain only one outcome type, which may indicate potential batch effects. Batch 2 has a mix of 'mTCC,' 'Normal,' and 'sTCC−CIS' samples, whereas Batch 4 and 5 are more specific to certain conditions. The imbalance in distribution, combined with the significant difference in the number of samples between batches (ranging from 4 to 19 samples), can introduce confounding effects. The differences between groups may be due to batch effects rather than true biological differences. This variation in sample sizes across batches could impact downstream analyses, such as differential expression studies, leading to misleading results.

Batch	Biopsy	mTCC	Normal	sTCC−CIS	sTCC+CIS	Total_samples
1	0	11	0	0	0	11
2	0	1	4	13	0	18
3	0	0	4	0	0	4
4	5	0	0	0	0	5
5	4	0	0	3	12	19