**Supplementary Figures**

**Supplementary Figure 1:** GO enrichment analysis results for differential genes.



**Supplementary Figure 2:** Forest plot showed the result of multivariate cox analysis



**Supplementary Figure 3:** Kaplan Meier analysis revealed that up-expression of AR, DEFB1, LRRK2, SEMA3G and down-expression of ULBP2, PTX3 were associated with better survival outcomes and low recurrence.



**Supplementary Figure 4:** Kaplan Meier analysis revealed that GEO verification database. (A) GSE65858. (B) GSE85446.



**Supplementary Figure 5:** Kaplan Meier analysis revealed that up-expression of B cell native, Mast cells resting, Plasma cells, T cells follicular helper, T cells regulatory (Tregs) and down-expression of Dendritic cells resting, Macrophages M2, Neutrophils, Mast cells activated were associated with better survival outcomes and low recurrence



**Supplementary Figure 6:** (A-D) High risk score was correlated with less immune cell infiltration and lower immune signature enrichment. Kaplan Meier analysis revealed grouping prognosis. ( *P*<0.001)



**Supplementary Figure 7:** Validation of Three IRGPIs mRNA Expression in Tissues (*P*<0.05)

 

**Baseline data of clinical information integrity 527 HNSC patients from TCGA cohort.**

|  |  |
| --- | --- |
| **Variables** | **TCGA cohort(n=527)** |
| **Age** |  |
| **<65** | **330(62.6%)** |
| **≥65** | **197(37.4%)** |
| **Gender** |  |
| **Male** | **385(73.1%)** |
| **Female** | **142(26.9%)** |
| **Pathology grade** |  |
| **G1+ G2** | **373(70.8%)** |
| **G3+G4** | **132(25.0%)** |
| **Unknow** | **22(4.2%)** |
| **Clinical stage** |  |
| **Stage I+II** | **100(19%)** |
| **Stage III+IV** | **352(66.8%)** |
| **unknow** | **75(14.2%)** |
| **AJCC T** |  |
| **T0+T1+T2** | **189(35.9%)** |
| **T3+T4** | **276(64.1%)** |
| **unknow** | **62(9.9%)** |
| **AJCC N** |  |
| **N0+N1** | **247(46.9%)** |
| **N2+N3** | **180(34.1%)** |
| **unknow** | **100(19%)** |
| **AJCC M** |  |
| **M0** | **190(36.1%)** |
| **M1** | **1(0.1%)** |
| **unknow** | **336(63.8%)** |