**Supplementary Table 1 External validation of key biomarkers via multiple online databases.**

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|  | LHX2 (oncogene) | USP18(oncogene) | IL2RA (oncogene) | IL5RA (oncogene) | TLR7 (oncogene) | IL21R (oncogene) | GCNT1 (oncogene) | CHST7 (oncogene) |
| UALCAN | K-M: P = 0.94 | K-M: P = 0.17 | K-M: P = 0.013 | K-M: P = 0.009 | K-M: P = 0.008 | K-M: P = 0.029 | K-M: P < 0.001 | K-M: P = 0.046 |
| UCSC Xena | K-M: P = 0.036 | K-M: P = 0.240 | K-M: P = 0.021 | K-M: P = 0.146 | K-M: P = 0.026 | K-M: P = 0.146 | K-M: P = 0.008 | K-M: P = 0.081 |
| LinkedOmics | K-M: P = 0.048Correlation: R = 0.463P = 0.001 | K-M: P = 0.106 | K-M: P = 0.077Correlation: R = 0.300P = 0.039 | K-M: P = 0.137 Correlation: R = 0.328P = 0.023 | K-M: P = 0.031Correlation: R = 0.613P < 0.001 | K-M: P = 0.229Correlation: R = 0.519P < 0.001 | K-M: P = 0.016Correlation: R = 0.282P = 0.052 | K-M: P = 0.278Correlation: R = 0.467P < 0.001 |
| GEPIA | K-M: P = 0.160Expression: P > 0.05Correlation: R = 0.61P < 0.001 | K-M: P = 0.260Expression: P < 0.05 | K-M: P = 0.130Expression: P < 0.05Correlation: R = 0.44P = 0.002 | K-M: P = 0.280Expression: P > 0.05Correlation: R = 0.45P = 0.001 | K-M: P = 0.041Expression: P > 0.05 Correlation: R = 0.69P < 0.001 | K-M: P = 0.11Expression: P < 0.05Correlation: R = 0.71P < 0.001 | K-M: P = 0.039Expression: P > 0.05Correlation: R = 0.55P < 0.001 | K-M: P = 0.037Expression: P > 0.05Correlation: R = 0.61P < 0.001 |
| cBioportal | Correlation: R = 0.609P < 0.001K-M: P < 0.001 | K-M: P = 0.210 | Correlation: R = 0.085P = 0.615K-M: P < 0.001 | Correlation: R = 0.446P = 0.006K-M: P = 0.546 | Correlation: R =0.517P = 0.001K-M: P = 0.674 | Correlation: R = 0.559P < 0.001K-M: P = 0.786 | Correlation: R = 0.370P = 0.024K-M: P = 0.533 | Correlation: R = 0.428P = 0.008K-M: P = 0.354 |
| Human protein atlas | NA | Normal: Not detected | Normal: Medium | NA | Normal: Not detected | Normal: Medium | Normal: Low | NA |

Abbreviations: LHX2, LIM Homeobox 2; USP18, Ubiquitin Specific Peptidase 18; IL2RA, Interleukin 2 Receptor Subunit Alpha; IL5RA, Interleukin 5 Receptor Subunit Alpha; TLR7, Toll Like Receptor 7; IL21R, Interleukin 21 Receptor; GCNT1, Glucosaminyl (N-Acetyl) Transferase 1; CHST7, Carbohydrate Sulfotransferase 1.