

Flow cytometric assessment of T cell clonality for early detection of ATL: experience in the clinic

Watber PC^{1*}, Wolf SN^{1*}, Haddow J², Taylor GP^{1,2}, Cook LBM^{1,2} and Rowan A¹.

¹ Department of Infectious Disease, Imperial College, London, UK.

² Imperial College Healthcare NHS trust, London, UK.

*These authors contributed equally.

Background:

We established a flow cytometric assay that identifies oligoclonal expansions within HTLV-1-infected T-cells by quantifying T-cell receptor V β subunit (TCRV β) expression by CCR4+CD26- T-cells. A high oligoclonality score (OCI-flow score) of >0.770 identifies HTLV-1-carriers with an increased risk of developing ATL. Here, we report our experience using the assay to risk-stratify HTLV-1 carriers in the UK.

Methods:

Peripheral blood mononuclear cell (PBMC) samples sent to the Molecular Diagnostic Unit at Imperial College were stained with antibodies specific for 24 TCRV β subunits, -CD3, -CD4, -CD8, -CCR4, -CD26, -CD7, -Ki-67 and a viability stain. Cells were analysed by flow cytometry, and the OCI-flow score was calculated. We evaluated the rate of change of OCI-flow scores for a total of 499 person/years follow up (f/u) in n=16 individuals who had PBMC with OCI-flow scores >0.770 (median f/u 3.6 years), and n=69 individuals who had PBMC with OCI-flow scores \leq 0.770 (median f/u 4.2 years).

Results:

We observed a negligible increase in OCI-flow scores in the OCI-flow \leq 0.770 group (median increase 0.00002/year). In contrast, OCI-flow scores in the OCI-flow>0.770 group increased significantly faster (median increase of 0.012/year, p=0.004, Mann-Whitney). Five people we screened were later diagnosed with ATL (n=2 Acute, n=2 Lymphomatous and n=1 Smouldering/Cutaneous subtype). PBMC from 5/5 of these people had an OCI-flow score >0.770 prior to ATL-diagnosis, with 4/5 >0.770 at the earliest sample available for testing. Time from the first OCI-flow >0.770 score to diagnosis with ATL ranged from 7 months to 12.5 years (median 3.5 years).

Conclusion:

Oligoclonality increases significantly faster in people with high OCI-flow scores (>0.770) versus people in the OCI-flow \leq 0.770 group, consistent with the presence of clones which have a selective advantage over other HTLV-1-infected cells in the blood of people with high OCI-flow scores. A high OCI-flow score preceded ATL development in 5/5 people.

Disclosure of Interest Statement:

Nothing to disclose.