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## Expression and function of the chemokine, CXCL13, and its receptor, CXCR5, in AIDS-associated non-Hodgkin's lymphoma

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AIDS-associated Non-Hodgkin's lymphoma (AIDS-NHL) remains a problem even in the era of effective anti-retroviral therapy. Recent studies have suggested that the chemokine, CXCL13, and its receptor, CXCR5 may play a role in B cell tumors (non-AIDS-associated). Normally, CXCL13 is expressed in secondary lymphoid tissues and directs the homeostatic movement of CXCR5(+) B cells through these areas.

To evaluate the role that CXCL13 and CXCR5 might play in AIDS-NHL, serum of individuals (n = 46) who ultimately developed AIDS-NHL was obtained from the Multicenter AIDS Cohort Study (MACS) at UCLA. The AIDS-NHL serum specimens tested were collected at a mean of 8.9 months prior to NHL diagnosis (SD = 7.9 months). Sera from AIDS (non-lymphoma), healthy HIV-positive, and HIV-negative control subjects were also included in the study. The mean CXCL13 level in the AIDS-NHL group (158 pg/ml, SD = 153) was ~50 percent higher than the AIDS control group (98.4 pg/ml, SD = 70.9, P = 0.02). Furthermore, CXCL13 levels correlated with sCD44 levels in the AIDS-NHL group (R = 0.31, P = 0.04), but not in the AIDS control group (R = 0.07; P = 0.7, data not shown); we previously showed that sCD44 levels are elevated prior to AIDS-NHL development. CXCL13 levels in the AIDS-NHL group were also ~2.5 times greater than levels in the

HIV-positive group, and ~7 times greater than levels in the HIV-negative group (P < 0.001 for both comparisons).

Next, tissue arrays were obtained from the AIDS & Cancer Specimen Resource (ACSR) that contained numerous sections of primary AIDS-NHLs, including both the Burkitt and diffuse large cell subtypes. By immunohistochemistry, all primary AIDS-NHLs (24/24) expressed CXCR5, and 22/24 of the AIDS-NHL specimens also showed expression of CXCL13. Cell lines derived from primary AIDS-NHL tumors also showed strong expression of CXCR5, and occasionally, low levels of expression of CXCL13. AIDS-NHL cell lines also demonstrated chemotaxis towards CXCL13.

These results indicate that CXCL13 and CXCR5 may play a role in the biology of AIDS-NHL, possibly by affecting the movement of pre-malignant and/or malignant B cells.