

Oral presentation

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Human Immunodeficiency Virus-specific B cells in human breast milk

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from Fifth Dominique Dormont International Conference. Mother-to-child transmitted viral diseases: from transmission to children care Paris, France. 26–28 March 2009

Published: 22 July 2009

Retrovirology 2009, **6**(Suppl 1):O8 doi:10.1186/1742-4690-6-S1-O8

This abstract is available from: <http://www.retrovirology.com/content/6/S1/O8>

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Background

Breast milk is a component of the mucosal immune system, and contains specific antibodies and lymphocytes that may modulate the infectivity of milk, and therefore the risk of HIV-1 transmission via breastfeeding. While secretory antibodies (Ab) have been extensively explored in human breast milk, the existence, features, and function of B lymphocytes remain to be described in this compartment.

Methods

We analysed breast milk and blood lymphocytes from 12 HIV-1-infected lactating women. All women were treated by anti-retroviral therapy or have been recently exposed to anti-retroviral drugs for prophylaxis of mother-to-child transmission. Milk samples were collected 5 to 42 days post partum. Phenotype of breast milk cells were analyzed by flow cytometry and cells function by ELISpot assays.

Results

In contrast to their blood counterpart, naive B cells remained largely underrepresented in breast milk. Breast milk B cells mostly consisted of IgD⁻ memory B cells. They displayed a phenotype of class-switched memory B cell, with few IgD⁺ memory and naive B cells. As compared with blood, higher percentages of activated B cells (CD38⁺), large size B cells, plasmablasts and plasma cells (CD19⁺, CD20^{low/-}, CD27^{high}, CD138⁺) were found. This indicates that a significant proportion of breast milk B

cells underwent terminal plasma cell differentiation. We also observed a higher frequency of cells secreting spontaneously Ig in breast milk. Among these cells, IgG-secreting cells (SCs) predominated over IgA-SCs as measured by Ig-ELISpot assays. Specific Ab-SCs were investigated following polyclonal activation using the CD40L ligation. The detection of anti-HIV-1-SCs demonstrated the existence of B cells specific to HIV-1 Ag in breast milk from HIV-1-infected women. Finally, we observed that breast milk B lymphocytes bore a unique profile of adhesion molecules (CD44⁺, CD62L⁻, $\alpha 4/\beta 7^{+/-}$, $\alpha 4/\beta 1^{+}$) suggesting that these cells may originate from the gut-associated lymphoid tissue (GALT).

Conclusion

Breast milk from lactating women infected by HIV-1 contains activated B cells including cells specific to HIV-1 antigens. These cells display a phenotype strikingly different from blood, with a mucosal homing profile related to B cells located in the GALT.