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Characterization of B cells in synovial fluid and tissue from patients with JIA

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Aim

The nature of B cell subsets infiltrating the synovial membrane from JIA patients is poorly defined. To this aim we performed an immunophenotypic and functional characterization of B cells in JIA patients.

Methods

MNC from synovial fluid (SF) and paired peripheral blood (PB) from 25 JIA patients and 20 age-matched controls were analyzed with multi-colour flow cytometry.

Results

SF B cells were found to be significantly enriched in $CD27^+$ switch memory (sm) 1 cells and in the recently identified isotype class switch memory ($CD19^+CD27^-IgG^+IgA^+$) B cells (sm2) compared to paired and healthy PB ($P < 0.0001$). CCR5, CCR8, and CCR9 expression was significantly higher on SF sm1 and sm2 B cells than on correspondent paired PB B cells ($P < 0.001$). Naïve (IgD^+, $CD27^-$) B cells were significantly reduced in SF compared to paired and control PB ($P < 0.0001$). Similarly, transitional B cells ($CD19^+CD24^{high}CD38^{high}IgM^{high}IgD^{high}$) were significantly less numerous in SF than in paired PB from JIA patients ($P < 0.0001$).

Plasma blasts were significantly enriched in SF than in paired PB ($P = 0.005$). ELISPOT experiments showed significantly higher proportions of $CD19^+$ IgG secreting cells in SF *vs* paired JIA PB ($P = 0.028$). Histological analysis of synovial tissue sections demonstrated the presence of lymphoid aggregates containing clusters of $CD20^+$ cells surrounded by $CD138^+$plasmablasts/plasmacells producing predominantly IgG.

Conclusion

These findings support a model whereby memory B cells are selectively attracted through chemokine gradients to the inflamed joints of JIA patients and differentiate locally into plasmablasts/plasmacells in the absence of ectopic follicular structures.