

Abstract 28

Comparative Analysis of the Cord Blood Bank in Quebec

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Introduction: In the context of the regional diversity observed in the population of Quebec, the Héma-Québec Cord Blood Bank (HQ CBB) representation differs from that of the Héma-Québec Stem Cell Registry (HQ Registry). The Bank encourages registrants of non-European descent to promote diversity, and only collects from health centers around Montreal and Quebec cities because of proximity concerns.

Objective: In this study, we aimed to analyze allele frequencies in the HQ CBB to assess similarities and differences in reference to the HQ Registry.

Methods: The HQ Registry was previously typed using high-resolution genotyping. For the HQ CBB, ambiguous two-field HLA-A, -B, -C, and -DRB1 typing data were obtained from cord blood units. Statistical analyses were performed using the GENE[RATE] population analysis tools to estimate allele and haplotype frequencies by administrative region determined by registered postal codes. Hardy-Weinberg equilibrium was verified by the nested likelihood procedure. Finally, genetic distance was compared between the HQ Registry and the HQ CBB by region using Non-metric Multi-dimensional Scaling (NMDS).

Results: Because of the small sample size in certain regions, HLA frequency was analyzed for 7 of the 17 regions within the HQ CBB with typings from 11,472 cord blood units. The HLA allele frequencies were previously assessed for the Registry, with 3,806 donors originating from 14 administrative regions. The Hardy-Weinberg equilibrium was rejected at least in relation to one locus in 3 regions (Capitale-Nationale, Montreal, and Laval), which differs from the results obtained from the Registry, in which the equilibrium was rejected only for Montreal. As in the Registry, allele frequencies in the HQ CBB varied by region but had limited overlap with the HQ Registry. Two regions (Chaudière-Appalaches and Laval) demonstrated significant differences in allele frequencies as represented in the HQ Registry versus the HQ CBB.

Discussion: We observed differences in the Quebec population representation between the HQ CBB and the HQ Registry. This probably represents selection bias related to recruitment strategies and inclusion criteria. Importantly, the complementarity of these two stem cell sources could allow for a more diverse donor pool, and this understanding could also guide the recruitment strategies.