B-cell development : one problem, multiple solutions.

ABSTRACT

Interspecies variations in the processes of B-cell development and repertoire generation contrast with the greater consistency of T-cell development. B-cell development in mice and humans, with postnatal B-cell generation of new repertoire in the bone marrow throughout life, is regarded as the 'standard' pattern. In contrast, accounts of B cells in birds, sheep, cattle, rabbits and pigs (the 'other' species) describe cessation of gene diversification in the perinatal period, with the gut-associated lymphoid tissue (GALT) functioning as the primary lymphoid organ thereafter. It has become customary to regard the developmental pathways of T and B cells within any individual species as being as dissimilar as the functions of the two mature cell types. Reinterpretation of B-cell development patterns in different species is overdue in response to two types of reports. The first of these describe T-B 'crossover', specifically the intrathymic production of B cells and the extrathymic production of T cells. The second attests to the extent of sharing of B-cell developmental features across the two groups of species. We propose that, as is a feature of other haematopoietic cells, a menu of alternative B- and T-cell pathways has been retained and shared across species. A single pathway usually predominates in any species, masking alternatives. The observed predominance of any pathway is determined by factors such as placental permeability, extent of maturation of the immune system by birth and the feasibility of direct experimental intervention in development.

Keyword: B lymphocyte; Developmental pathway; Inter-species; Lymphogenesis; Antibody diversity.