Epidemiology of HLA-B27 and Arthritis

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Summary

HLA-B27 is present throughout Eurasia but is virtually absent among the genetically unmixed native populations of South America, Australia, and among equatorial and southern African Bantus and Sans (Bushmen). It has a very high prevalence among the native peoples of the circumpolar arctic and subarctic regions of Eurasia and North America, and in some regions of Melanesia. Results of recent epidemiologic studies of spondyloarthropathies in populations with a relatively high prevalence of B27 are also reviewed.

Key words

HLA-B27, Spondyloarthropathies, Prevalence, Ankylosing Spondylitis Reactive Arthritis

HLA-B27 is present throughout Eurasia, North Africa and North America but is virtually absent among the genetically unmixed native populations of South America and Australia (1,2). In sub-saharan Africa, B27 is present among West Africans and among pygmies in central Africa, but is virtually absent in other native populations of equatorial and southern Africa, such as Bantus and Sans (Bushmen) (1-3). There is a high prevalence of B27 among the native people of the circumpolar arctic and subarctic regions of Eurasia and North America, and in some regions of Melanesia (1). An overview of the phenotype frequencies of B27 and its 9 subtypes among the various population subgroups has recently been published (1).

The highest prevalences of both B27 and ankylosing spondylitis (AS) have been observed among the Haida Indians living on Queen Charlotte Islands of the Canadian province of British Columbia (1). They show a 50% prevalence of B27 and definitive AS has been reported to occur in 4% of the adult male Haida population (4,5). Yupik and Inupiat Eskimos of Alaska show a 40% and a 25% prevalence of B27, respectively, and there is a 0.4% prevalence of AS in the general adult population; while the overall prevalence of all forms of spondyloarthropathies, including AS, is 2.5% (6). Both undifferentiated spondyloarthropathy and reactive arthritis (ReA) are more common than AS, and the disease prevalence is quite similar in men and women. A high prevalence of spondyloarthropathies, especially ReA (including Reiter’s syndrome), has also been observed in Inuit Eskimos of Canada and Greenland, and among other north American natives. However, psoriasis and psoriatic arthritis are very rare among the Eskimos and other native Americans.

The native Chukchis of Siberia show a 19 to 34% prevalence of B27, while the Siberian Eskimos, like their North American counterparts, show a 40% prevalence of B27 (1). There is a similarly high prevalence of spondyloarthropathies in their general population (7,8). A recent collaborative epidemiologic study of four indigenous population groups in Siberia (the Chukchi and Eskimo) and Alaska (the Inupiat and Yupik Eskimo) shows an overall prevalence of spondyloarthropathies to vary between 2% to 3.4% (7,8,9). The prevalence of all types of spondyloarthropathies was 4.2% among the B27 positive individuals (25% to 40% of the whole population) in the four groups combined, while that of AS alone was 1.6%. These and other results of recent epidemiologic studies of spondyloarthropathies in populations with a relatively high prevalence of B27 are summarised in Table 1.

The natives of northern Scandinavia (Lappland) called Samis (or Lapps) have a 24% prevalence of B27, and the prevalence of AS in their general population is 1.8% (1). It has also been estimated that 6.8% of B27 positive Samis suffer from AS (10). The B27 prevalence in Hungary, Finland, and Estonia ranges between 12% to 16% (1). The populations of these countries are genetically related to the Ugro-Finnish people of the Autonomous Mordova Republic in Russia, who show a 15 to 17% prevalence of B27, and spondyloarthropathies are relatively quite common in these populations. A community-based epidemiological study in Mordova Republic found a 0.5% prevalence of AS, ten times higher than in the general Russian population (Lydia Benevolenskaya, personal communication).
The prevalence of B27 varies between 10 to 16% in Iceland and among the non-Sami populations of northern parts of Norway and Sweden, (1,11,12). Northern Norwegians and Swedes show a much higher prevalence of AS (up to 1.4%) than the 0.2% prevalence (200 cases per 100,000) observed among western European populations (3,12).

It is of interest that AS appears to be less common among the native Indonesians than in the Chinese living in Indonesia, even though the prevalence of B27 is more than two times higher in the Indonesian general population (13). Moreover, an apparent lack of association between B27 and spondyloarthropathies was observed among the native Indonesians.

B27 is absent among the Australian aborigines of unmixed ancestry, and they don’t suffer from AS (1). There is a virtual absence of B27 in the Bantu and San populations of unmixed ancestry; and AS and related spondyloarthropathies had rarely been reported before the current explosive increase of HIV infection in Africa (1).

A recent retrospective study from Togo, a small west African country, indicates that spondyloarthropathy frequency rate in Black Africa is expected to increase in the future because of HIV infection; 8 of 31 (26%) spondyloarthropathy patients seen on rheumatological consultation between October 1989 and January 1992 were infected with HIV, whereas the local HIV prevalence rate among blood donors was 4% (14). These 8 patients had no sacroiliitis and they mostly suffered from oligoarthritis, spinal pain, diarrhea and weight loss, while 9 of the remaining 23 patients had AS with bilateral sacroiliitis and 14 had reactive arthritis without sacroiliitis. B27 typing was not performed in any of the 31 patients. An increased frequency of spondyloarthropathy is being observed among Blacks in Durban, South Africa (Cassem, personal communication) and in Harare, Zimbabwe (Latief, personal communication). These cities have a very high prevalence of HIV infection among Blacks; for example, ante-natal HIV testing in Durban shows that 19.2% of these women are infected (Cassem, personal communication).

Prevalence of HLA-B27 among Americans of African descent (blacks) varies between 2% to 3%, most likely resulting from genetic admixture with Americans of European descent (whites), 8% of whom possess B27 (1). A study of 176 Caribbean blacks (98 Jamaican and 78 Colombian) showed absence of B27 (15). There is a comparatively lower prevalence of AS among African blacks than among whites, and the association of AS with B27 is also weaker among blacks (close to 50%) than among whites (more than 90%) (1). Moreover, American black B27-positive individuals carry a significantly lower relative risk for getting AS than their white counterpart (1,2).

ReA (including Reiter’s syndrome) occurs in about 1 to 4% of individuals following chlamydial urogenital infection or entritis due to gram-negative bacteria, but the incidence can be much higher during some epidemics of bacterial enteritis. In Finland the annual incidence of chlamydia-induced ReA (confirmed by positive genitourethral culture of Chlamydia) is 4.6 per 100,000, and that of post-enteritic ReA is 5 per 100,000 population (11). Its prevalence, like that of AS, varies with the prevalence of B27 (11). Prevalence of ReA in the United Kingdom is estimated to be 16 cases per 100,000 population, but the annual incidence, especially of Chlamydia-induced reactive arthritis, has declined in Europe and the United States since 1985 (16).

Upto 20% of patients with ulcerative colitis or Crohn’s disease develop arthritis, and one-fourth of them have axial disease. Subclinical gut inflammatory lesions have been observed in many spondyloarthropathy patients; the lesions are histologically acute in 25% and chronic in 30%. Followup studies indicate that 15 to 25% of those with chronic lesions develop clinically obvious Crohn’s disease. These Crohn-like gut lesions are not associated with the presence of B27, and support the existence of a B27-independent pathogenic link between gut inflammation and spondyloarthropathy (1).