

CORRESPONDENCE

This department is for the publication of informal communications that are of interest because they are informative and stimulating, and for the discussion of controversial matters. The mandate of this JOURNAL is to disseminate information relating to leprosy in particular and also other mycobacterial diseases. Dissident comment or interpretation on published research is of course valid, but personality attacks on individuals would seem unnecessary. Political comments, valid or not, also are unwelcome. They might result in interference with the distribution of the JOURNAL and thus interfere with its prime purpose.

An Atypical Site in HLA-DQB1 Detected in
Leprosy Patients

TO THE EDITOR:

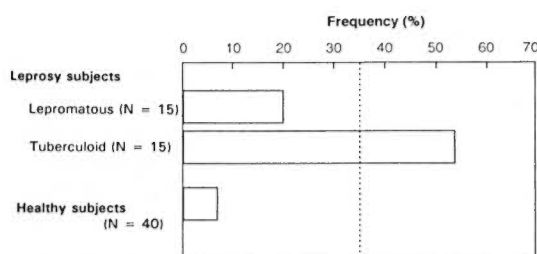
Leprosy, a chronic disease caused by the infection of *Mycobacterium leprae*, shows a wide spectrum of clinical features. This spectrum is attributed to the differences in antigen-specific cellular-immune responsiveness to the pathogen (¹⁻⁶). In particular, lepromatous leprosy is characterized by the specific T-cell tolerance to *M. leprae*. This unresponsiveness is supposed to be associated with particular human leukocyte antigen (HLA) DQ alleles in several populations (^{3,8}). The antigen recognition of most *M. leprae*-reactive T cells is restricted by HLA-DR (⁴); nevertheless, the unresponsiveness in lepromatous patients is supposed to be involved with the immune suppression through the DQ-restricted antigen recognition (^{5,7}). Thus, HLA-DQ molecules play a significant role in the *M. leprae*-specific immune responses.

We recently reported that the gene variation, an atypical *Bam*HI restriction site in the intron upstream of the exon 3 of HLA-DQB1 coding DQ β chain, was found more frequently in patients with early onset periodontitis (EOP), a type of periodontal disease, than in periodontally healthy subjects (⁹). EOP is a general name for diseases which cause severe destruction of periodontal tissues at an early age, including prepubertal periodontitis, juvenile periodontitis and rapidly progressive periodontitis. It is suggested that the pathogenesis of EOP often involves an abnormality of the immune response, which is ascribed to the cell func-

tions of neutrophils, lymphocytes and macrophages against the microorganism residing in periodontal pockets (¹⁰).

We examined the distribution of this atypical *Bam*HI restriction site of HLA-DQB1 in leprosy patients. The participants in this study were 30 Japanese patients with a history of leprosy (15 lepromatous patients and 15 tuberculoid patients) in the Ohshima Seisho-En National Leprosarium and 40 Japanese healthy controls who were free from leprosy and periodontal diseases at the time of this examination. The atypical site in HLA-DQB1 could be detected by polymerase chain reaction (PCR) amplification of genomic DNA and restriction fragment length polymorphism (RFLP) analysis after digestion with the restriction endonuclease, *Bam*HI. Genomic DNA was prepared from peripheral blood lymphocytes. PCR was performed using the forward primer 5'-GAG TGC CTT TTA ATT GGG GTG-3' and the reverse primer 5'-GTA GAC GTC TCC ACG CTG GGG-3'. These primers amplify 1000-base pair (bp) products comprising positions 4001-5000 of HLA-DQB1 corresponding to the report by Larhammer, *et al.* (²).

Eleven (three lepromatous and eight tuberculoid patients) out of 30 (36.7%) leprosy subjects possessed the atypical *Bam*HI restriction site in HLA-DQB1 versus 3 out of 40 (7.5%) healthy donors. The frequency of the atypical site in HLA-DQB1 in the leprosy patients, especially in the tuberculoid patients (53.3%), was significantly greater than that in the healthy subjects



THE FIGURE. Frequencies of subjects with the atypical *Bam*HI restriction site in HLA-DQB1. The dotted line shows the frequency of early onset periodontitis patients with the atypical *Bam*HI restriction site in HLA-DQB1 (*).

(7.5%) (The Figure). In this connection, the frequency in the tuberculoid patients was higher than that in EOP patients (*).

The facts described above suggest that leprosy patients, especially tuberculoid patients, frequently possess an atypical site in HLA-DQB1. These results aroused our interest in the involvement of this atypical site in HLA-DQB1 in the unique immune response of tuberculoid patients.

—Hideki Ohyama, D.D.S.
Atsushi Nagai, D.D.S., Ph.D.
Shogo Takashiba, D.D.S., Ph.D.

Department of Periodontology and
Endodontology

—Hidemi Kurihara, D.D.S., Ph.D.

Associate Professor
Department of Periodontology and
Endodontology
Okayama University Dental School

—Kazuko Sugiyama, M.D.
Shinzo Inoue, M.D., Ph.D.

National Leprosarium Ohshima Seisho-En
6034-1, Aji-cho, Kita-gun
Kagawa 761-01, Japan

—Mutsue Mizushima, M.D., Ph.D.
Akinori Kohzuma, M.D., Ph.D.

National Leprosarium Oku Komyo-En
6253, Mushiage, Oku-cho, Oku-gun
Okayama 701-45, Japan

—Yoji Murayama, D.D.S., Ph.D.

Chairman
Department of Periodontology and
Endodontology

Okayama University Dental School
2-5-1, Shikata-cho
Okayama City 700, Japan

Reprint requests to Dr. Murayama.

Acknowledgment. This work was supported by research grants (1992, 1993) from the Ministry of Health and Welfare, Japan. We are grateful to Takayuki Kono, Sadae Kajiwara, Satoko Kohmoto and Kohichi Sawada for technical assistance.

REFERENCES

- BULLOCK, W. E. Leprosy: a model of immunological perturbation in chronic infection. *J. Infect. Dis.* **137** (1981) 341–354.
- LARHAMMAR, D., HYLDIG-NIELSEN, J. J., SERVENIUS, B., ANDERSSON, G., RASK, L. and PETERSON, P. A. Exon-intron organization and complete nucleotide sequence of a human major histocompatibility antigen DC β gene. *Proc. Natl. Acad. Sci. U.S.A.* **80** (1983) 7313–7317.
- OTTENHOFF, T. H. M. and DE VRIES, R. R. P. HLA class II immune response and suppression gene in leprosy. *Int. J. Lepr.* **55** (1987) 521–534.
- OTTENHOFF, T. H. M., ELFERINK, B. G., HERMANS, J. and DE VRIES, R. R. P. HLA class II restriction repertoire of antigen specific T cells. I. The main restriction determinants for antigen presentation are associated with HLA-D/DR and not with DP and DQ. *Hum. Immunol.* **13** (1985) 105–116.
- OTTENHOFF, T. H. M., WALFORD, C., NISHIMURA, Y., REDDY, N. B. B. and SASAZUKI, T. HLA-DQ molecules and the control of *Mycobacterium leprae*-specific T cell nonresponsiveness in lepromatous leprosy patients. *Eur. J. Immunol.* **20** (1990) 2347–2350.
- RIDLEY, D. S. and JOPLING, W. H. Classification of leprosy according to immunity; a five-group system. *Int. J. Lepr.* **34** (1966) 255–273.
- SALGAME, P., CONVIT, J. and BLOOM, B. R. Immunological suppression by human CD8⁺ T cells is receptor dependent and HLA-DQ restricted. *Proc. Natl. Acad. Sci. U.S.A.* **88** (1991) 2598–2602.
- SERJEANTSON, S. W. HLA and susceptibility to leprosy. *Immunol. Rev.* **70** (1983) 89–112.
- TAKASHIBA, S., NOJI, S., NISHIMURA, F., OHYAMA, H., KURIHARA, H., NOMURA, Y., TANIGUCHI, S. and MURAYAMA, Y. Unique intronic variations of HLA-DQ β gene in early-onset periodontitis. *J. Periodontol.* (in press).
- VAN DYKE, T. E., LESTER, M. A. and SHAPIRA, L. The role of the host response in periodontal disease progression: implications for future treatment strategies. *J. Periodontol.* **64** (1993) 792–806.