

Another association between the properdin system (BF) and insulin-dependent diabetes in south India

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In a previous paper (Kirk et al. 1982) we reported a strong association between the rare properdin factor BF S1 and insulin-dependent diabetes among patients in north India. We have now extended our study to include insulin-dependent diabetics in south India and have found a strong association with the BF F factor and no association with BF S1.

Because of the relative rarity of insulin-dependent diabetes (IDDM) with an age of onset less than 30 years in south India, we have examined a total of 77 IDDM patients from three centres in south India: all were born in one of the four southern Indian states of Andhra Pradesh, Karnataka, Kerala or Tamil Nadu. Age-at-onset of the disease ranged from 3-27 years and 67 of the patients were 20 years or less when the disease was diagnosed. All were ketosis-prone and insulin-dependent.

Table 1 gives the distribution of BF phenotypes in the IDDM patients and in a control series of healthy persons belonging to social groups comparable to those of the patients and whose place of birth was also in one

of the four southern states. For comparative purposes a series of 72 south Indian non-insulin dependent diabetics (NIDDM) from Madras also is included. The corresponding BF gene frequencies are given in Table 2.

There is a significant increase among IDDM patients when compared with controls in the BF F phenotype and a corresponding fall in the BF S phenotype ($\chi^2_{(2)} 12.3 : 0.01 > P > 0.001$). This increase in the BF F phenotype is reflected also in a significant difference in the BF*F gene frequency be-

Table 1.
BF phenotypes in south Indian diabetics and controls.

| | No. | S | FS | F | SS1 | FS1 |
|----------|-----|------|------|------|-----|-----|
| Controls | 96 | 45 | 38 | 8 | 4 | 1 |
| % | | 46.9 | 39.6 | 8.3 | 4.2 | 1.0 |
| NIDDM | 72 | 35 | 33 | 3 | 0 | 1 |
| % | | 48.6 | 45.8 | 4.2 | 0.0 | 1.4 |
| IDDM | 77 | 23 | 30 | 21 | 1 | 2 |
| % | | 29.8 | 39.0 | 27.3 | 1.3 | 2.6 |

Table 2.
BF percent gene frequencies in south Indian diabetics and controls.

| | BF* S | BF* F | BF* S1 |
|----------|-------|-------|--------|
| Controls | 68.8 | 28.6 | 2.6 |
| NIDDM | 71.5 | 27.8 | 0.7 |
| IDDM | 50.0 | 48.1 | 1.9 |

tween IDDM patients and controls (48.1 and 28.6% respectively $\chi^2_{(1)} 15.9 : P < 0.001$). There are no significant differences for phenotypes or gene frequencies between controls and NIDDM patients. The relative risk for the BF F phenotype in IDDM is 4.1.

In contrast to previous results for north Indian IDDM patients (Kirk et al. 1982), there is no significant difference in the BF S1 types between south Indian controls and either IDDM or NIDDM patients. This suggests that the susceptibility allele(s) for IDDM in south India arose independently from the susceptibility allele(s) in north India. Alternatively, it is possible that a different aetiological factor with a distinctive genetic susceptibility is present in the south. In this context it is interesting to note that Hammond & Asmal (1980) reported a striking contrast for HLA associations between diabetic patients in South Africa whose ancestors were originally from

south or north India. We are continuing to investigate the HLA types of our patients in India to determine linkage disequilibria values between HLA and BF and other chromosome 6 markers.

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References

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