Bardet-Biedl Syndrome

Alternative Names
BBS
Bardet-Biedl Syndrome 1
BBS1
Bardet-Biedl Syndrome 2
BBS2
Bardet-Biedl Syndrome 3
BBS3
Bardet-Biedl Syndrome 4
BBS4
Bardet-Biedl Syndrome 5
BBS5
Bardet-Biedl Syndrome 6
BBS6
Bardet-Biedl Syndrome 7
BBS7
Bardet-Biedl Syndrome 8
BBS8
Bardet-Biedl Syndrome 9
BBS9
Bardet-Biedl Syndrome 10
BBS10
Bardet-Biedl Syndrome 11
BBS11

WHO International Classification of Diseases
Congenital malformations, deformations and chromosomal abnormalities

OMIM Number
209900

Mode of Inheritance
Autosomal recessive
Digenic, recessive

Gene Map Locus
20p12, 16q21, 15q22.3-q23, 14q32.1, 12q21.2, 11q13, 7p14, 4q27, 3p12-q13, 2q31

Description
Bardet Biedl syndrome is a group of rare disorders characterized by obesity, retinitis pigmentosa, polydactyly, possible mental retardation, renal failure, hypogonadism, and delayed development. Although the clinical demarcation of the syndrome is clear, it is highly heterogeneous at the genetic level. Eleven genes are known to be associated with BBS, and the syndrome is therefore, classified into 11 types; BBS1 to BBS11. BBS is a rare disorder, affecting only about one in 150,000 individuals in North America and Europe. However, among Arabs, the prevalence rate is much higher, at about one in 13,500 individuals, suggesting a founder effect. Though commonly confused with it, Laurence-Moon syndrome is a separate entity from BBS.

Diagnosis of BBS can be established on the basis of both the clinical findings, as well as molecular genetic testing. There is no known cure for BBS per se. However, early diagnosis allows for the patient to be monitored for the typical symptoms, so that the individual symptoms can be treated for, as soon as they appear.

Molecular Genetics
BBS is transmitted in an autosomal recessive manner. A recessive digenic mode of inheritance has also been reported. The protein products of most of the 11 genes identified have been found to be localized to the basal body and centrioles of the cell. This indicates the involvement of these proteins in the cell signaling pathway mediated by the cilia, as well as in the intraflagellar transport of proteins along the cilia. Mutations in these genes disrupt the signaling and the transport, leading to the varied effects seen. For instance, the retinal dystrophy is due to defects in the retinal cilia.

Epidemiology in the Arab World

Kuwait
Farag and Teebi (1988) indicated that in the Arab population of Kuwait, 26 cases in 15 families were ascertained to have Bardet-Biedl

syndrome (20 cases in 13 families) or Laurence-Moon syndrome (6 cases in 2 families). In 1989, Farag and Teebi indicated that the prevalence of Bardet-Biedl syndrome among Bedouins of Kuwait is approximately 1 in 13,500.

Lebanon

Stoetzel et al. (2006) performed a genome-wide scan in a large, consanguineous Lebanese pedigree, in order to identify novel BBS genes. SNP mapping in this pedigree identified two regions of homozygosity; one that encompassed the BBS2 locus, and one other 8Mb region on chromosome 12q. This new region contained 23 annotated genes, one of which, FLJ23650, was a putative chaperonin. Sequencing of this gene revealed an S311A mutation in all the BBS patients. A group of 107 Lebanese and 50 European controls failed to show this mutation. The FLJ23650 was identified as a novel BBS locus, BBS10.

Oman

Soliman et al. (1996) evaluated growth parameters and hypothalamic-pituitary-gonadal and growth functions in five children with Bardet-Biedl syndrome (BBS). Three of the five children had stature below the fifth percentile for age. Their growth hormone (GH) response to provocation was defective, and computed tomographic (CT) scanning revealed empty sella in all of them. All the children were obese (body mass index [BMI] > 95th percentile for age). Three had hypercholesterolemia. Their basal serum testosterone concentration and testosterone response to 3-day human chorionic gonadotropin (HCG) stimulation were significantly lower than the levels in 12 age-matched obese normal children. Testosterone secretion failed to respond to HCG therapy for 4 weeks. Both basal gonadotropin levels (luteinizing hormone [LH] and follicle-stimulating hormone [FSH]) and gonadotropin responses to LH-releasing hormone (LHRH) stimulation were normal and did not differ among the two study groups. Soliman et al. (1996) noted that primary hypogonadism is a cardinal feature of BBS, and it may be accompanied by hypothalamic and pituitary abnormalities.

Yemen

Levy et al. (1970) reported three cases of Laurence-Moon-Biedl-Bardet syndrome in a Jewish Yemenite family. No further details could be obtained as of date.

References

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Contributors

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