(MultiMap): a human genome linkage map. Nature Genet 6: 384–390
Miller SA, Dykes DD, Polesky HF (1988) A simple salting out procedure for extracting DNA from human nucleated cells. Nucleic Acids Res 1:1215
Nham SU, Wilkemeyer MF, Ledley FD (1990) Structure of the human methylmalonyl-CoA mutase (MUT) locus. Genomics 8:710–716
Ott J (1985) Analysis of Human genetic linkage. John Hopkins University Press, Baltimore
Popescu NC, Amsbaugh SC, DiPaolo JA, Tronick SR, Aaronson SA, Swan DC (1985) Chromosomal localisation of three human ras genes by in situ molecular hybridisation. Somat Cell Mol Genet 11:149–155
Volz A, Boyle JM, Cann HM, Cottingham RW, Orr HT, Ziegler A (1994) Report of the second international workshop on human chromosome 6. Genomics 21:464–472
Weissenbach J, Gyapay G, Dib C, Vignal A, Morissette J, Millasseau P, Vaysseix G, et al (1992) A second-generation linkage map of the human genome. Nature 359:794–801
Zerres K (1992) Autosomal recessive polycystic kidney disease. Clin Invest 70:794–801
Zerres K, Mücher G, Bachner L, Deschennes G, Eggermann T, Kääriäinen H, Knapp M, et al (1994) Mapping of the gene for autosomal recessive polycystic kidney disease to chromosome 6p21-cen. Nature Genet 7:429–432

0002-9297/94/5506-0027$02.00

Am. J. Hum. Genet. 55:1284, 1994

On the Diversity of β-Globin Mutations, a Reflection of Recent Historic Events in Israel

To the Editor:

In a recent issue of the *Journal*, Filon et al. (1994) report on the characterization of 500 β-thalassemia genes in the Israeli population and explain the broad heterogeneous spectrum of mutations they found by the various ethnic groups present in the country and by the history of their migration. This approach is particularly interesting from an anthropological point of view and also for the design of an efficient diagnostic strategy in all countries with highly mixed populations.

On the basis of their outstanding technical results, the authors provide a convincing explanation for the mutations found among Israeli Jews, which indeed reflects recent historic events of the state of Israel. However, they surely oversimplify their interpretation concerning the Arabs. One can presume that the group they call Bedouins are truly Arabs from the Arabian Peninsula and that the Druze are probably an autochthonous people. But they refer to other groups as being Moslem Arabs or Christian Arabs, which by far are not ethnic categories. The diffusion of Islam is a sociocultural fact, starting from the seventh century, and people from extremely varied origins have become Moslem since then.

Our own investigations have not so much concerned the Middle East Arabs as northern Africa Arab countries, the populations of which are Moslem and Arab speaking. There, too, we found a high heterogeneity of mutations (Bennani et al. 1993, 1994). When comparing those mutations, as well as their genetic background, to the data of the literature, we indeed observe a coincidence with major historical influences, but first they relate to more ancient events, and, second, they are not at all associated with the Arabs.

Roman veterans settled for several centuries wherever the Roman Empire extended, including the land of the present state of Israel. More recently, from the 16th to the 19th century, almost all the Arab countries were under the domination of the Ottoman Empire, and we find among Arabs many thalassemic mutations originally described among Turks. A third clear influence is that of the Greek community, which was a world of travelers.

Considering the historical data, these considerations should be as true for Israeli Arabs as they are for the Algerians or Tunisians, not to mention Moroccans, who are more complex still, in that they present also with remnants of Spanish and African migrations. Thus, a more in-depth interpretation of the many thalassemic mutations found among Israeli Arabs, which will provide information of great interest, should be sought.

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References

Bennani C, Bouhass R, Perrin-Pecontal P, Tamouza R, Malou M, Elion J, Trabuchet G, et al (1994) Anthropological approach to the heterogeneity of β-thalassemia mutations in northern Africa. Hum Biol 66:369–382
Bennani C, Tamouza R, Rouabhi F, Benabadji M, Malou M, Elion J, Labie D, et al (1993) The spectrum of β-thalassaemia in Algeria: possible origins of the molecular heterogeneity and a tentative diagnostic strategy. Br J Haematol 84:335–337
Filon D, Oron V, Krichevski S, Shaag A, Shaag Y, Warren TC, Goldfarb A, et al (1994) Diversity of β-globin mutations in Israeli ethnic groups reflects recent historic events. Am J Hum Genet 54:836–843

0002-9297/94/5506-00028$2.00