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Anthropologist Special Issue No. 3: 263-284 (2007)

Genetic Epidemiology of Arterial Blood Pressure: A Review

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KEYWORDS Hypertension. Environment. Risk Factors. Families. Sibs. Molecular Genetics. Genome Wide Scan.

ABSTRACT Worldwide hypertension affects almost 20% of the adult population. The rates of hypertension have shown an increasing trend in recent times especially among the developed and developing countries. A comprehensive review of the literature on the genetics of blood pressure and hypertension encompassing the pre-molecular and molecular phase of the research is being presented. Many studies have used the familial nature, family history, twins and family based approaches to establish the genetic nature of BP and hypertension. Most studies have found that environmental variables also play an important role in BP regulation. Studies trying to establish the mode of inheritance (major/minor genes) of BP/hypertension, in the pre-molecular phase, have been either inconclusive or gave conflicting results. Molecular genetic approaches in the investigation of the genetic basis of BP and hypertension have largely relied on rare Mendelian forms of hypertension, candidate gene approaches, comparative mapping and genome wide screening in both animal and human models, using linkage and association studies. Genome wide scan studies have shown that all human chromosomes except 13 and 20 have shown regions of significant association with BP or hypertension. However, the lack of consistency in the nature of associations found is glaringly apparent which may be due to the complex nature of the BP/hypertension phenotype, probably determined by multifactorial inheritance. Future studies on traditional and transitional homogenous populations with proper sampling of individuals hold the key to further resolving the problem of hypertension. Studies on Indian populations because of their endogamous nature might be fruitful in establishing the precise nature of association between BP and gene polymorphisms.