

Racial Stratification of Organochlorine Insecticide Residues in Human Adipose Tissue

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The racial stratification of residues of total DDT equivalent, heptachlor epoxide, oxychlorthane, dieldrin, beta-benzene hexachloride and lindane in human adipose tissue was studied. Samples of human adipose tissue were obtained from locations selected in the contiguous United States according to a stratified, proportionate-random survey design and chemically analyzed for selected organochlorine pesticides. The most marked case of racial difference in residue level was total DDT equivalent. Samples from Negroes contained almost twice as much of this chemical as did samples from Caucasians. Racial stratification also was found in the frequency of lindane. Lindane was detected about twice as often in samples from Negroes than in samples from Caucasians. Little racial differences were noted for residues of beta-benzene hexachloride, heptachlor epoxide, dieldrin and oxychlorthane.

Many organochlorine insecticides are currently being scrutinized because of their food chain mobility and because either their residues or metabolites, or both, are found in human tissues. Humans may be exposed to these pesticides through various parts of the environment. Basically, man may absorb these chemicals by three routes: ingestion, respiration, and absorption through skin and mucous membranes. Their disposition after entry into the human body depends upon the pharmacodynamic characteristics of the particular pesticide chemicals. Some organochlorine insecticides tend to have lipid-affinities and to be metabolized very slowly, which results in accumulation in adipose tissues.

The presence of organochlorine residues in human adipose tissue has been shown for some time. DDT was detected in human adipose tissue colorimetrically in 1950 from samples collected in the District of Columbia.¹ Studies on the distribution of these

residues have shown that geographic, demographic, and socioeconomic factors are influential. In a population survey of 800 residents of Dade County, Florida, serum levels of DDT and DDE were significantly lower in the more affluent social classes than they were in the less affluent classes in both races.² A positive age association for DDT-derived material has been reported for human adipose tissue of Israelis.³ In that same study, males generally were found to have higher storage levels of DDT than females. On the other hand, studies of the organochlorine insecticide content (dieldrin, DDT and its transformation products, and lindane) of human adipose tissue from southeastern England reported no significant differences associated with age.⁴

Several investigations have shown a racial distribution of some organochlorine pesticides. Both serum and adipose specimens from Negroes in the United States were found to contain higher amounts of DDT and its transformation products than in similar specimens from Caucasians.⁵⁻⁶ In studies comparing residue levels of Anglo-Americans and Mexican-Americans residing in southern Texas, no differences were found between males and females, but there were significantly higher residues of DDT, DDE and dieldrin in Mexican-Americans than in Anglo-Americans.⁷ However, in a survey conducted in Dade County, Florida, dieldrin concentrations did not differ when the study cohort was stratified as to age, sex or race.⁸ Although these results from the literature appear contradictory, it should be remembered that these data are from limited geographic locales and that small sample sizes are involved in most.

This article reports organochlorine residue levels in human adipose tissue collected from the general population on a nationwide basis in the conterminous United States during fiscal years 1973 and 1974. These data were developed by the National Human Monitoring Programs of the U.S. Environmental Protection Agency. This program functions to determine, on a national scale, the incidence and level of exposure to pesticides experienced by the general population and to identify changes and trends in these parameters. Pesticide residues and metabolites detected reflect man's total past exposure to these chemicals and his physiologic ability to handle them.

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