

# Environmental Prints on Human Cells, Tissues and DNA

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There is growing concern of Environmental Impact on Human health resulting from involuntary and voluntary exposure to hazards.

The assessment of the damage caused by the environment to the human body is histologically expressed. Environmental Pathology (1) is defining the descriptive approach of Pathology to morphological changes occurring from environmental factors in tissue, cells and DNA. Such changes refer to reversible and irreversible lesions.

Scientific subjects included in the objectives of Environmental Pathology:

*Inhaled substances:* Atmospheric pollution, tobacco, inhaled powders (silicon, carbon, asbestos), lead and chemical mixtures and particulates. There has been an increasing amount of evidence that many inhaled substances originating from atmospheric pollution (2), tobacco or inhaled powders (3) are related to respiratory disorders and may increase the number of cancer cases located to organs of the respiratory system (4).

*Chemical substances and mixtures:* Medical drugs (contraceptives, chemotherapeutic agents), pesticides, endocrine disruptors (dioxin, organochlorides), alcohol, addicting drugs (heroin, cocaine), formaldehyde. The most disturbing

groups of chemicals are those, which are persistent and also accumulative in fat and hence concentrate at the food chain. These are collected throughout life and are passed from mother to child during pregnancy and breast feeding (5). These include, for example, a number of organochlorine compounds some of them pesticides (6,7). As far as the dioxin-like substances are concerned, has been acknowledged by a Dutch government sponsored study, to be causing hormone disruption, immunosuppression and neurobehavioral defects in infants in a dose relation to the levels found in mothers' breast milk (Toxicology Index of Health 1998).

*Radiation:* Ionizing/Non ionizing radiation, diagnostic medical radiation, therapeutic medical radiation, other types of radiation including electromagnetic fields and radon. The atomic bomb explosions at Hiroshima and Nagasaki as well as the nuclear accidents at Chernobyl have demonstrated the considerable correlation between the radiation and increased occurrence of cancer. Meanwhile, there is an increasing concern about the health effects of electric and magnetic fields (8). They have been formulated associations of concern between residential exposure and childhood cancers, occupational exposure and adult leukemia and brain cancer.

*Food and water.* Water pollution, nutritional additives, genetic manipulation, malnutrition and obesity. Nutrition additives such as glutamate or aspartame have demonstrated to have serious neurotoxicity effects. Meanwhile, the invasion of ge-

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netic engineering to human nutrition brings the human being to the brink of unknown, as no one can be aware of the interactions between the human genetic material and the genetically manipulated ingredient. However, some allergic reactions towards these ingredients have been already registered. In addition the genetic manipulation of plants and animals jeopardizes the biodiversity of our ecosystems flora and fauna.

*Environmental issues:* Biodiversity, environmental ethics, climate and human health, sustainable development. The impoverishment of ecological biodiversity constitutes a serious threat to the survival of human beings as it attacks the life chain. Moreover the climate change creates considerable dangers to the human health such as emerging or re-emerging infectious diseases. Thus, it is high time we envisaged a sustainable development of our societies that sincerely respects the ecosystem's function.

The Mechanisms and Mode of Action of environmental impact on tissue level can be either through the type of Inflammatory Reaction (Fibrogenic or Non Fibrogenic), Neoplastic Proliferation or Immune Response. On cellular and DNA level, effects are mainly present by Calcium modification, membrane associated alterations, DNA-adducts, chromosomal aberrations and variations of the activity of metabolizing enzymes,

depletion of co-factors or metabolites, depletion of energy (ATP) stores, interactions with receptors.

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