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# PRE-NATAL EPIGENETIC INFLUENCES ON ACUTE AND CHRONIC DISEASES LATER IN LIFE, SUCH AS CANCER: GLOBAL HEALTH CRISES RESULTING FROM A COLLISION OF BIOLOGICAL AND CULTURAL EVOLUTION

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Better understanding of the complex factors leading to human diseases will be necessary for both long term prevention and for managing short and long-term health problems. The underlying causes, leading to a global health crisis in both acute and chronic diseases, include finite global health care resources for sustained healthy human survival, the population explosion, increased environmental pollution, decreased clean air, water, food distribution, diminishing opportunities for human self-esteem, increased median life span, and the interconnection of infectious and chronic diseases. The transition of our pre-human nutritional requirements for survival to our current cultur-ally-shaped diet has created a biologically-mismatched human dietary experience. While individual genetic, gender, and developmental stage factors contribute to human diseases, various environmental and culturally-determined factors are now contributing to both acute and chronic diseases. The transition from the hunter-gatherer to an agri-cultural-dependent human being has brought about a global crisis in human health. Initially, early humans ate sea-sonally-dependent and calorically-restricted foods, during the day, in a "feast or famine" manner. Today, modern humans eat diets of caloric abundance, at all times of the day, with foods of all seasons and from all parts of the world, that have been processed and which have been contaminated by all kinds of factors. No longer can one view, as distinct, infectious agent-related human acute diseases from chronic diseases. Moreover, while dietary and environmental chemicals could, in principle, cause disease pathogenesis by mutagenic and cytotoxic mecha-nisms, the primary cause is via "epigenetic", or altered gene expression, modifications in the three types of cells (e.g., adult stem; progenitor and terminally-differentiated cells of each organ) during all stages of human development. Even more significantly, alteration in the quantity of adult stem cells during early development by epigenetic chemicals could either increase or decrease the risk to various stem cell-based diseases, such as cancer, later in life. A new concept, the Barker hypothesis, has emerged that indicates pre-natal maternal dietary exposures can now affect diseases later in life. Examples from the studies of the atomic bomb survivors should illustrate this insight.

**Key words:** barker hypothesis, adult stem cells, epigenetic, metabolic diseases, cell communication