New Technologies and New Understandings of Human Being

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Abstract

Most new technologies developed today are evaluated using risk-assessment frameworks aimed at detecting adverse effects for human bodies. This paper argues that dose-effects models used to evaluate the safety of novel technologies – including nanotechnology and genetically engineered organisms -- invoke nineteenth century constructions of the human mind/body that are ontologically divergent from the systems construction of human openness being carved out by emerging fields, most especially environmental genomics. The formulation of life and its vulnerabilities offered by environmental genomics deconstructs nineteenth century boundaries delineating the somatic body, mind and environment by focusing instead on the complex and synergistic interactions among DNA, RNA, proteins, cells, etc. and nuanced environmental inputs whose convergence optimizes or destabilizes atomic and molecular bodily processes.

Environmental genomics and other complex systems approaches to understanding *being* are conceptually replacing reductionism, mechanism, and determinism, yet our protocols for assessing new technologies' safety and for predicting the range of human exposure effects too often remain indebted to nineteenth century medical ontologies. This assertion will be demonstrated using two related case analyses of gene-linked diseases that are increasingly believed to be mediated by environmental exposures: autism and genomic mosaicism. Case analyses disclose how nineteenth century formulations of human corporeality continue to limit understandings of how novel human technologies have contributed to rising disease incidents by failing to account for their components' and effluents bioaccumulation, bio magnification, synergistic effects, epigenetic activations, and genomic destabilizations. Indeed, anachronistic and limited formulations of human being may actually threaten our existence.

This paper contends that the ontology of human openness is not blindly rejected by decision makers (both producers and regulators) who deploy anachronistic protocols for assessing potential impacts caused by new technologies. Rather, reductionist and mechanistic models of human vulnerability to new technologies may be purposively selected by key decision makers because nineteenth-century models promise greater certainty in their predicted outcomes because of the uniformity of their inputs, the mechanism of their operations, and the narrow

range of effects modeled. Indeed, when debating implementation of the 1976 Toxic Substance Control Act, expert scientists testified that although exposures to toxins ought to be conceptualized in terms of DNA damage, business considerations warranted adopting short-term clinical mortality trials using laboratory animals, often fish.

This paper concludes by advocating for our ethical responsibility towards future being in the process of developing and adopting novel technologies given lessons learned from autism and genetic mosaicism. New technologies may, in in fact, be indispensable for human survival in the context of eco-system shocks resulting inadvertently from heedless engineering. However, from the perspective of the ontology of human openness, human *Being projected into the future* is most fundamentally dependent upon recognition of the special interconnectedness and complex vulnerabilities of all *being* on Earth, conceived broadly in terms of the integrity of the collective genome upon which human Existence depends.