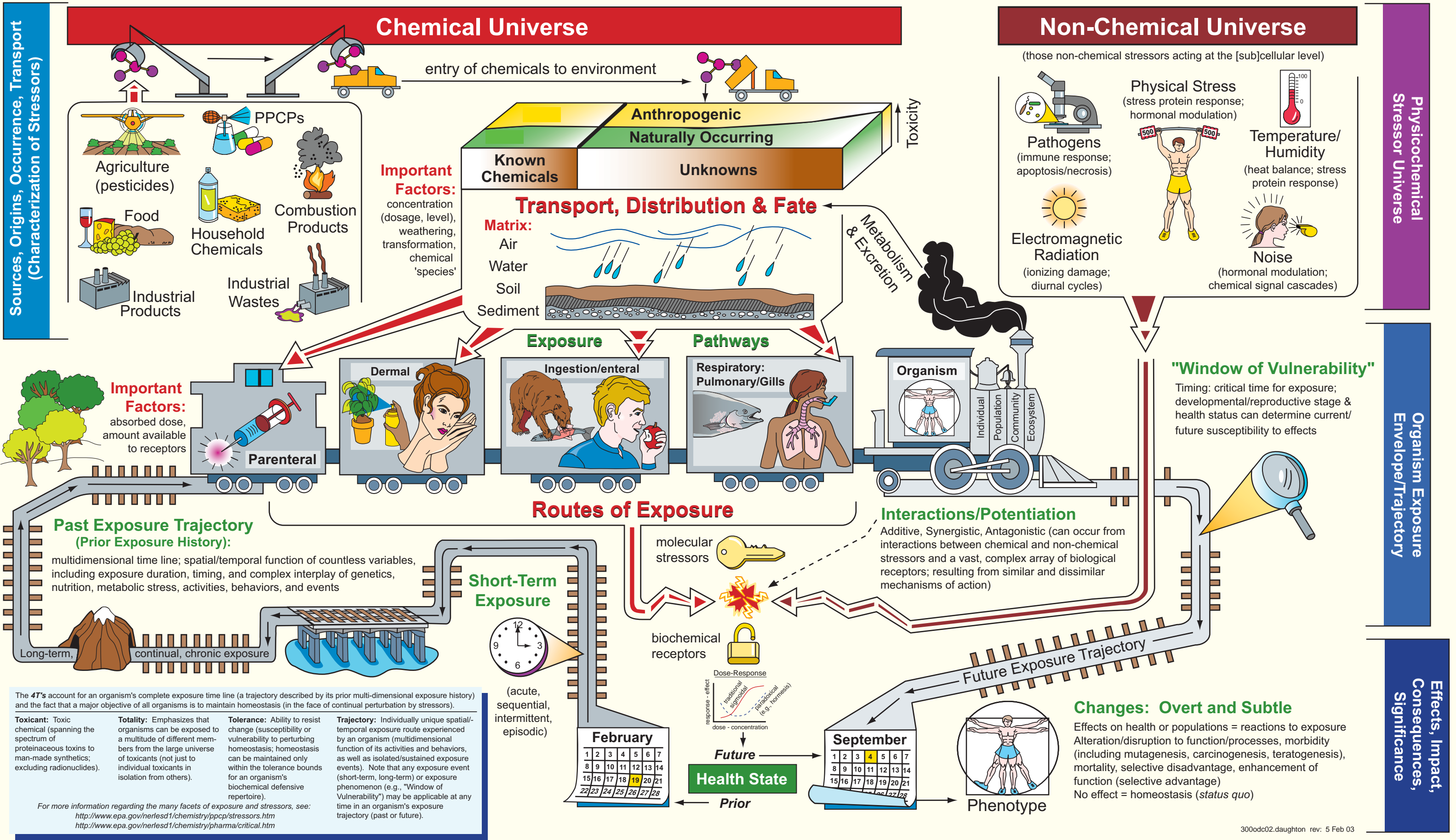




Biological Systems and Stressors

"Toxicant Totality Tolerance Trajectory" - 4T's



The 4T's account for an organism's complete exposure time line (a trajectory described by its prior multi-dimensional exposure history) and the fact that a major objective of all organisms is to maintain homeostasis (in the face of continual perturbation by stressors).

Toxicant: Toxic chemical (spanning the spectrum of proteinaceous toxins to man-made synthetics; excluding radionuclides).

Totality: Emphasizes that organisms can be exposed to a multitude of different members from the large universe of toxicants (not just to individual toxicants in isolation from others).

Tolerance: Ability to resist change (susceptibility or vulnerability to perturbing homeostasis; homeostasis can be maintained only within the tolerance bounds for an organism's biochemical defensive repertoire).

Trajectory: Individually unique spatial/temporal exposure route experienced by an organism (multidimensional function of its activities and behaviors, as well as isolated/sustained exposure events). Note that any exposure event (short-term, long-term) or exposure phenomenon (e.g., "Window of Vulnerability") may be applicable at any time in an organism's exposure trajectory (past or future).

For more information regarding the many facets of exposure and stressors, see:
<http://www.epa.gov/nerlesd1/chemistry/ppcp/stressors.htm>
<http://www.epa.gov/nerlesd1/chemistry/pharma/critical.htm>

Daughton CG "Biological Systems and Stressors: 'Toxicant Totality Tolerance Trajectory' - 4T's," U.S. EPA, Las Vegas, NV; illustrated poster, October 2002; available: <http://www.epa.gov/nerlesd1/bios/daughton/stressor.pdf>