US Environmental Protection Agency:
Environmental Pollution and Liver function

Lead Agency:

US Environmental Protection Agency

Agency Mission:

The mission of the U.S. Environmental Protection Agency (EPA) is to protect public health and safeguard the natural environment.

Principal Investigator:

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General Description:

EPA scientists are beginning to understand how the liver response changes with aging and exposure to environmental chemicals. The liver is both the most important part of the body for protecting individuals from toxic chemicals and the target organ for many environmental pollutants. Understanding how the liver responds to exposure to environmental chemicals is critical to characterizing risk to older adults.

Experimental models demonstrate that aging is accompanied by mild decreases in the capacity to detoxify and eliminate environmental pollutants. These models help the Agency understand how much of the toxic response is attributable to changes in metabolism and how much is due to other changes in biological capacity with aging.

This important research allows risk assessors to better understand how exposure to toxic chemicals can affect older adults' health. In addition, data generated by this study is helping the EPA include polypharmacy -- the use of two or more drugs together, which is common in the older adult population -- in its consideration of risk and its design of risk mitigation efforts.

This research complements EPA's efforts to address the scientific goals laid out by the National Academies of Science in their report on "Toxicity Testing in the 21st Century." An important aspect of this work is that it is helping EPA produce more efficient models that predict how to better protect older adults while reducing the use of animal testing.

Excellence: Why is this project exceptional?

US EPA scientists have been invited to present this research at invited symposia for Health Canada, California EPA, and Society of Toxicology.

Significance: How is this research relevant to older persons, populations and/or aging society?

The liver is both the most important part of the body for protecting individuals from toxic chemicals and the target organ for many environmental pollutants. Understanding how the liver response changes with aging is critical to characterizing risk to older adults. EPA research suggests that there are decreases in liver detoxification capacity in older adults. These changes, in combination with other changes in the aging body's capacity to respond to toxicity, are likely responsible for increased sensitivity to environmental chemicals in the older adults.

Effectiveness: What is the impact and/or application of this research to older persons?

This research allows risk assessors to better understand how toxic exposures affect older adults' health. It allows the Agency to consider factors such as polypharmacy, common in the older adult population, in its consideration of risk and its design of risk mitigation efforts.

Innovation: Why is this research exciting or newsworthy?

This research complements EPA's efforts to address scientific goals laid out by the National Academies of Science in their report on "Toxicity Testing in the 21st Century." The work will allow EPA to produce predictive models to better protect older adults while increasing efficiency and reducing the use of animals in testing.