

# FACT SHEET

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## Naval Health Research Center Detachment (Toxicology) Dayton, Ohio



Nearly fifty years ago the Navy established a toxicology research capability to keep pace with the rapid growth in the chemical industry, the development of complex weapons systems and the potential of mission degradation resulting from health hazards. What began as the Navy Toxicology Unit at the National Naval Medical Center in Bethesda, MD in 1958 has evolved into the Naval Health Research Center Detachment (Toxicology), Dayton, OH. Today the toxicology detachment is focused on designing equipment and procedures to ensure force protection and maintain operational readiness. Scientists conduct research on the toxicological properties of Navy-unique materials and on new Navy-specific toxicology methods, including:

- Neurotoxicology of jet fuels
- Method for understanding the respiratory failure of burn victims
- Method improvement for the cardiac sensitization effects on non-ODS halogenated chemicals, such as fire extinguishing agents and refrigerants
- Toxicity of the chemical causing submarine yellowing
- Toxicity of environmentally degrading chaff
- Methods for determining performance decrement from chemical exposure
- Toxicology of smoke from burning advanced composite materials
- Neurotoxicity of heat-degraded jet turbine lubricant

### Tri-Service Toxicology

Toxicology research efforts from the Navy, Army and Air Force were collocated at Wright-Patterson AFB in 1991. Tri-Service Toxicology has many customers within DoD including material developers, operational commands, health and hygiene agencies, and the surgeons general. Working together, scientists and technicians employ performance decrement test batteries, physiologically-based pharmacokinetic modeling, *in vitro* screens, and mechanistic studies, in addition to standard toxicity tests to evaluate the potential hazards posed by new chemicals and materials found in operational settings.



The vision of Tri-Service Toxicology is to be an integral asset within DoD as the center of excellence for toxicology research solving the challenges of today and anticipating those of the future.

### Tri-Service Toxicology can conduct research in the following research areas:

- Pharmacokinetics/dynamics
- Neurobehavioral Effects
- Analytical Chemistry
- Aerosols/Inhalation
- Applied Toxicology
- Biotransformation
- Biological Effects
- Hazard Evaluation
- Risk-Assessment

## Research

### Occupational Toxicology

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- Deployment toxicology assessment program
- Deployment toxicology exposure scenarios
- JP-8 fuel studies
- DBNP studies
- Reproductive toxicology

### Neurobehavioral Toxicology

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- Scientists are developing exposure models to measure performance deficits
- JP-8 fuel studies
- DBNP studies

### Inhalation Toxicology

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- Adult respiratory distress syndrome related to smoke inhalation
- Cardiac sensitization with biochemical and electrophysiological biomarkers
- JP-8 fuel studies
- DBNP studies
- Human toxicity of degradable chaff countermeasures

### Risk Assessment

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- Exposure potential when removing lead-based paint by sanding
- Acute oral LD50 for 2,6-Di-tert-butyl 4-Nitro Phenol
- DBNP studies
- JP-8 fuel studies
- Chemical terrorism countermeasures

### Environmental and Molecular Toxicology

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- Chaff studies
- Fatigue protein studies
- JP-8 fuel studies

### Reproductive Toxicology

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- JP-8 fuel studies
- DBNP studies

### Analytical Toxicology

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- Flow injection analysis for the determination of metals
- Exposure assessment
- DBNP studies

## Examples of Accomplishments

- Neurotoxicity assessments of TMPP (lubricants), DBNP (submarine atmosphere), JP-8 fuel, HFC-134a refrigerant, perchlorate (propellants).
- Computer modeling as a basis for extrapolation between laboratory aerosols and those found in the workplace
- Replacements for Halon fire suppressants and coolants
- Ozone depleting substance replacements
- Advanced tissue-based biosensors to identify chemical threats
- Developmental Neurotoxicity Assessments of Perchlorate
- At the request of the US Air Force, researchers completed initial investigations of respiratory/pulmonary toxicity caused by short-term inhalation of smoke from combustion of carbon-graphite/epoxy composite material (cgeCM) of the type used in the construction of the B2 bomber

NHRC DET (Toxicology) web site <http://www.navy.al.wpafb.af.mil>