NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
## 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## INTEGRATIVE MEDICINE

URINE, SPOT

| | Result | Range | Units |
|---|---|---|---|
| 25. Homovanillic Acid (HVA) | 2.48 | 1.40 - 7.60 | ug/mgCR |
| 27. 5-Hydroxyindoleacetic Acid (5HIAA) | 2.63 | 1.60 - 9.80 | ug/mgCR |

**Neurotransmitter Metabolism Comment** 5HIAA IS WITHIN RANGE:
5HIAA is the major metabolite of Serotonin.

| | | | |
|---|---|---|---|
| 34. 2-Methylhippuric Acid | 0.01 | 0.00 - 0.19 | ug/mgCR |

**Detoxification/Toxicants Comment**

DETOXIFICATION INDICATORS:
The organic acids of this group serve as biomarkers of detoxification status or biotransformation capacities, distinct parts of the detoxification system, providing insight about both exogenous toxin accumulation and endogenous detoxification responses.
Elevations in toxicant and detoxification markers reveal aspects of xenobiotic exposure, endogenous toxins and detoxification functions.

**Xylene Exposure**

| | | | |
|---|---|---|---|
| 3,4-Dimethylhippurate | <0.01 | 0.00 - 0.02 | ug/mgCR |
| 3-Methylhippurate | <0.01 | 0.00 - 0.15 | ug/mgCR |

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
# 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## Xylene Exposure Comment

Xylene:
Found in many solvents (paints, perfumes, etc.). Used in insecticide\pesticide application. Metabolized to Methylhippurate, which is measured in urine.

Trimethylbenzene Metabolite (3,4-Dimethylhippurate) Comment:
SOURCES OF EXPOSURE
Mainly by inhalation of vapours, produced from refining of petroleum products.
Primary use is as a motor fuel additive.
Automotive emissions, poor emission-control devices on older vehicles, poor maintenance practices, diesel engine exhaust.
Solvent in coatings, paint thinners, wood preservatives, cleaners, dry cleaners, degreasers, aerosols, pesticides, printing and inks.
Component of white spirit, the most widely used solvent in the paint and coating industry.
Manufacture of pharmaceuticals, asphalt products, lacquers, varnishes, dyes, perfumes.
Occupational Exposure: scientific labs, janitors/cleaners, dry cleaning industry, automobile body and related repairers, construction labourers, house painters, screen cleaning processes, ski boots finishing, and telephone cable assembly.
People who do considerable home maintenance work or hobby work may be exposed via inhalation or dermal contact with the solvent.

EFFECTS
Irritation of mucous membranes, dermatitis, dizziness, "drunkenness", fatigue, headache, anxiety, nervousness.
Cyanosis, cognitive and motor impairment, apnea, bursts of perspiration, cardiac arrest.
Diarrhea, abdominal pains, nausea, blurred vision.
Low frustration tolerance, lack of initiative, apathy, depression, irritability (painter's syndrome) .
Neurotoxic.
Decreased erythrocyte, leukocyte and platelet counts.
Carcinogenic
Glomerulonephritis, renal dysfunction.

METABOLISM
Metabolized in the liver by cytochrome P-450 dependent multifunction oxidase enzymes, conjugated with glucuronic acid, glycine, or sulfates for urinary excretion.
Lipophilic and may accumulate in fat and fatty tissues.

## Toluene Exposure

| | | | |
|---|---|---|---|
| Hippurate | *1178* *H | 0.0 - 1070 | ug/mgCR |
| Benzoate | *9.33* *H | 0.00 - 9.30 | ug/mgCR |

(*) Result outside normal reference range (H) Result is above upper limit of reference rang

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
# 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## Toluene Exposure Comment

Toluene:
Found in paints, glues, sanitizing agents, cigarette smoke.
Benzoate is metabolized to Hippurate. Elevations may cause elevated Hippurate independent of Toluene.

A high reading of Hippurate may be indicative of an overgrowth of intestinal microbiota due to the action of bacteria on phenylalanine, elevated levels of environmental toxins (typically solvents) or elevated ingestion of benzoic acid.

Toluene Metabolite (Hippurate) Comment:
SOURCES OF EXPOSURE
Mainly by inhalation of vapours, produced from refining of petroleum products.
Tobacco smoke (80-100 micrograms per cigarette).
Used as a solvent carrier in paints, inks, thinners, coatings, adhesives, degreasers, pharmaceutical products.
Household aerosols, rust preventatives, solvent-based sanitizing agents and germicides, etc.
Additive in cosmetic products.
Occupational Exposure: paint, printing and leather finishing-industry, rubbercoating industry.
*Hippurate is also the end product of benzoate metabolism. Benzoate is derived from foods containing sodium benzoate additive.

EFFECTS
Depression or excitatory effects on the CNS -euphoria followed by disorientation, tremors, mood lability, tinnitus, diplopia, hallucinations, dysarthria, ataxia, convulsions, coma.
Irritation (eyes, nose, throat), dizziness, taste and olfactory fatigue.
Drowsiness, headache, impaired cognitive and motor function, insomnia, anorexia.
Solvent abuse through "sniffing" toluene products may lead to gross disorientation, neurological impairment and death.

METABOLISM
Toluene is metabolized in the liver by cytochrome P-450 dependent multifunction oxidase enzymes conjugated principally with glycine, and excreted as hippuric acid.
Smaller amounts are conjugated with glucuronic acid, hydroxylation to cresols, which are excreted as sulfate, or glucuronide conjugates.
In chronic exposure, significant uptake of toluene into lipid- rich tissues (adipose, CNS) may occur. Effects are reversible on cessation of exposure, but are increasingly severe and persistent with increasing concentration and/or duration of exposure.
Toluene interferes with the biotransformation of other compounds (benzene, xylene, and styrene).

An elevated reading of Benzoate may mean an overgrowth of certain intestinal microbiota, ingestions of excessive benzoic acid in the diet (preserved foods, pickles, lunch meats, cranberries), or poor Phase II detoxification capabilities as the conjugation of benzoate with glycine generally is very efficient. The presence of this compound may be due to the action of the bacteria on phenylalanine. Assessement of amino acid competency may be helpful especially plasma glycine.

## BENZENE EXPOSURE.

(*) Result outside normal reference range (H) Result is above upper limit of reference rang

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
## 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## INTEGRATIVE MEDICINE

| URINE, SPOT | Result | Range | Units |
|---|---|---|---|
| t,t-Muconic Acid | <0.01 | 0.00 - 0.17 | ug/mgCR |

### Trimethylbenzene Exposure

#### Benzene Exposure Comment

Benzene Metabolite (Trans, trans-muconic acid) Comment:

Sources of Exposure
Natural component of crude and refined petroleum. Present in automotive emissions and emissions from the production of xylene, toluene, styrene and other compounds.
Discharge or seepage of industrial wastewater from chemical/petrochemical industries.
By-product of tobacco smoke. First and second-hand smoke accounts for the largest source of benzene exposure for the general public. The amount of benzene in a single cigarette may vary from 5.9-90 micrograms.
Used in the manufacture of Styrofoam, resins, synthetic fibers and rubbers, gums, lubricants, dyes, glues, paints, and marking pens.

Occupational Exposure:
Industries that produce or use benzene or benzene-containing products - oil refineries, petroleum plants, tyre manufacturers, paint and shoe manufacturing plant, petrol stations, active or passive cigarette-smoke inhalation, and areas of heavy vehicular traffic.

Interfering Factors: Sorbic acid and potassium sorbate, common food preservatives, are metabolized to muconic acid, which may therefore cause elevations of this marker. Sources include; processed cheese slices and spreads, salad dressings, mayonnaise, flavoured drinks, canned foods, and baked goods. To eliminate this confounding variable, sorbic acid, is assayed and reported on the patient ' s Environmental Pollutants Profile if detected.

Effects:
Lowers blood parameters (haematocrit, haemoglobin level, red cell, white cell, platelet counts).
Bone marrow depression with aplastic anaemia, leukaemia, thrombocytopaenia.
Human carcinogen, Genotoxic.
Skin and eye irritation.
Central Nervous System depression,
Death.

Metabolism:
Following inhalation, most benzene is excreted through exhalation unchanged.
Benzene is metabolized by cytochrome P-450- dependent multifunction oxidase enzymes and excreted as conjugated derivatives (sulphates and glucuronides) .
Benzene and its metabolites accumulate in lipid depots.

### Styrene Exposure

| | | | |
|---|---|---|---|
| Mandelate | <0.01 | 0.00 - 0.40 | ug/mgCR |
| Phenylglyoxylate | 0.13 | 0.00 - 0.40 | ug/mgCR |
| Mandelate + Phenylglyoxylate | 0.13 | 0.00 - 0.64 | ug/mgCR |

(*) Result outside normal reference range (H) Result is above upper limit of reference rang

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
## 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## INTEGRATIVE MEDICINE

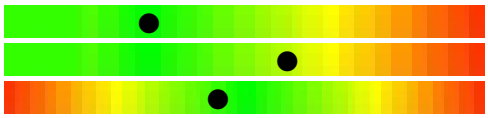
URINE, SPOT

| | Result | Range | Units |
|---|---|---|---|
| **Styrene Exposure Comment** | | | |

Styrene:
Used in the manufacturing of rubber, latex, and plastic products
Found in carpet backing, packaging materials, foam cups, etc. Central Nervous System depressant. Genotoxic. Metabolized to Phenylglyoxylate and Mandelate. Exposure best correlates to the sum of the two metabolites.

**Phthalate Exposure**

| | Result | Range | Units |
|---|---|---|---|
| Monoethyl Phthalate | <0.01 | 0.00 - 0.13 | ug/mgCR |
| Phthalic Acid | 0.12 | 0.00 - 0.18 | ug/mgCR |
| Quinolinate | 2.56 | 0.10 - 5.80 | ug/mgCR |



(*) Result outside normal reference range (H) Result is above upper limit of reference rang

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
# 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

## Phthalate Exposure Comment

Phthalic Acid Ester Metabolite (Phthalate):

SOURCES OF EXPOSURE
Used in the manufacture of plastics to soften resins and impart flexibility. Mostly used plasticizers in the manufacture of polyvinyl chloride (PVC) plastics utilized in vinyl flooring/tiles, wall covering, pool liners, tool handles, insulation of wires /cables, garden hoses, construction materials, canvas tarps, upholstery, food wrappers/containers, medical equipment tubing, children ' s toys, dishwasher baskets, notebook covers, flea collars, faux leather, shoe soles, traffic cones, latex adhesives, dyes, some pharmaceutical and pesticide formulations.
Detergents, lubricating oils, automobile parts, automobile undercoating, carpet backing, solvents, and personal-care products such as soaps, shampoo, hair spray, nail polish, and toothbrushes, baby-care products.
Diethyl Phthalate (parent compound of MEP) reported in over 70% of cosmetic products tested. Make fragrance in cosmetics and household products last longer.

Occupational Exposure: Plasticizer and PVC processing plants.
Quinolinate - Disrupts tryptophan metabolism resulting in the accumulation of quinolinic acid, an endogenous excitotoxin implicated in inflammatory neurological disorders. Quinolinate is a metabolite of the essential amino acid tryptophan in the kynurenine pathway which is chiefly activated by IFN -gamma and IFN -alpha. Quinolinate is markedly elevated in the CNS following trauma or inflammation, and is implicated in neuronal injury through activation of the N-methyl- D-aspartate (NMDA ) receptor.
Toxicity of phthalate esters, acting as metabolic disrupters, through accumulation of quinolinic acid, may be of concern with a tryptophan - rich diet and concomitant exposure to phthalate esters.

EFFECTS
Endocrine-Disrupting Chemical (EDC) .
Young infants may be more vulnerable to toxic effects. May alter development of male reproductive system.
Developmental and morphological abnormalities including deficits in behaviour and cognition.
Some reports of decreased sperm production in adult males exposed to environmental levels.
Associated with increased waist circumference and insulin resistance in adults.

METABOLISM
Phthalates are hydrolyzed in the gut by pancreatic lipase yielding ester derivatives, which are rapidly absorbed. These phthalate esters are metabolized in the liver by cytochrome P-450 dependent multifunction oxidase enzymes, into glucuronide conjugates and excreted.
Monoethylphthalate (MEP), in urine reflects exposure to diethylphthalate (DEP). About 70% is excreted in urine as its free monoester.
DEHP represents another widely used plasticizer in the manufacture of PVC. Exposure to DEHP and phthalates in general is noted by urinary levels of free phthalic acid, a further breakdown product of phthalates.
Phthalates and their metabolites accumulate in lipid depots. Bioaccumulation may result from chronic exposure.

PHTHALATE:

(*) Result outside normal reference range (H) Result is above upper limit of reference rang

NutriPATH
INTEGRATIVE PATHOLOGY SERVICES
P: 1300 688 522
E: info@nutripath.com.au

# TEST PATIENT
## 01-Jan-1958 Female

1 TEST CRT
BURWOOD VIC 3125

Dr.TEST DOCTOR
TEST HEALTH CENTRE
123 TEST STREET
BURWOOD VIC 3125

LAB ID : 3822147
UR NO. :
Collection Date : 15-Jun-2022
Received Date: 15-Jun-2022

0000000

Used as 'plasticizers' to make plastics flexible. Found in 2\3 of cosmetic products. Also found in time-released drugs and pesticide formulations. Known endocrine disruptors. Linked to male fertility problems. May increase the production of Quinolinate, which plays a role in inflammatory disorders. Shown to have Genotoxic potential in lymphocytes.

| | | | |
|---|---|---|---|
| **HVA/5HIAA Ratio** | **0.9** | 0.0 - 1.2 | RATIO |

**Urban Pollution Index**

**Urban Pollution Comment**

URBAN POLLUTION INDEX:
Research has showed that increased exposure to urban-type pollution increases levels of HVA and decreases 5-HIAA.
Looking at the ratio of HVA:5-HIAA may help in assessing one's overall exposure to pollution in general.

Tests ordered: OAEPoll

(*) Result outside normal reference range (H) Result is above upper limit of reference rang