INDICATIONS:

Urinary histamine metabolites including 1-methyl-histamine and 1-methyl-imidazole acetic acid are raised in conditions where there is increased histamine turnover, and this is generally due to proliferation of Mast Cells or Basophils. 1-methylimidazole acetic acid is not currently being analysed, but 1-methyl histamine appears to have equivalent or improved sensitivity in detecting these disorders.

Systemic Mastocytosis, Diffuse Cutaneous Mastocytosis, Basophilic Leukaemia
The level of urinary 1-methyl-histamine is extremely high (5 - 30 umoles/ 24 hours), while urinary histamine may be normal or only slightly raised. Blood histamine and 1-methyl-histamine may not be at all raised as histamine is rapidly metabolised and 1-methyl-histamine is rapidly cleared.

Localised Cutaneous Mastocytosis
The level of urinary 1-methyl-histamine may be slightly raised (1.6 - 4.5 umoles/ 24 hours), while urinary histamine is usually normal. Blood histamine and 1-methyl-histamine are normal.

Histamine Diet Infringement
Histamine present in the diet as fish or fermented foods may cause slight elevations of urinary histamine (0.9 -1.5 umoles/ 24 hours and 1-methyl-histamine (1.6 - 3.5 umoles/ 24 hours).

Urticaria Pigmentosa
Results are usually normal for Histamine and 1-methyl-histamine unless there is mast cell proliferation.

Flushing
Elevated histamine can produce flushing and episodes of hypotension. Although much rarer than Carcinoid Syndrome and other causes of flushing, the possibility of early stage systemic mastocytosis should be considered.

Anaphylaxis
Histamine release from Mast Cells following an immune challenge tends to produce a very short-lived pulse of histamine in blood, which is rapidly metabolised. This may be followed by a refractory period in which histamine turnover is lowered and consequently there is generally little or no increase in 24 hour urinary histamine and 1-methyl-histamine. Total blood histamine levels appear to increase in the first 2- 5 minutes after a challenge but return to normal within 15- 20 minutes. Blood 1-methylhistamine levels are generally unaffected by the challenge.

HISTAMINE AND 1-METHYL-HISTAMINE

DISTRIBUTION AND FREQUENCY:
Diseases of increased Mast Cell numbers are relatively rare, however our laboratory detects 2 - 5 new cases of Systemic Mastocytosis each year and around 10 - 20 cases
where histamine turnover is marginally elevated. In addition some patients with existing disease continue to be monitored throughout the course of treatment. Samples for histamine and 1-methy-histamine analysis are currently received from all states of Australia and from New Zealand.

TURNAROUND TIME:
Analysis is by solvent extraction followed by High Pressure Liquid Chromatography. The analytical procedure takes several days to complete and it is not feasible to measure small numbers or one-off samples. Currently the turnaround time is around 2-3 weeks with batches of 15-20 samples being received in that time. Reports are sent back to the referring laboratory or Clinician. The Children's Hospital has placed restrictions on faxing results to ensure patient confidentiality.

REFERENCE INTERVALS:
Urine Histamine: < 0.8 umoles/day Urine 1-Methyl-histamine: < 1.5 umoles/day
Blood Histamine: < 0.8 umoles/litre Blood 1-Methyl-histamine < 0.8 umoles/litre

URINE COLLECTION:
Patients should be on a histamine-free diet for 24 hours prior to and also for 24 hours during urine collection. Diet sheets and a suggested Menu sheet are available on request. Preservatives normally supplied for catecholamine collection should be used. For example: 10-20ml 6M hydrochloric acid added to the specimen container. A safety sign warning of the risk of burns from the acid preservative should be displayed on the container. The referring laboratory should measure the volume of the urine sample and send an aliquot of approximately 30ml together with a signed request form, patient's name, age, address, clinical notes and other details and must include the 24 hour volume measurement. Measurement of the urinary creatinine on 24 hour samples is unnecessary. Collection of random or spot urine collections is not recommended as reference intervals are unknown and the specificity and sensitivity of random urinary histamine and 1-methyl-histamine testing remains uncertain.

BLOOD COLLECTION:
Blood collection for histamine is not encouraged as it does not provide information on Mast Cell proliferation, and it is rarely possible to collect blood within 10 minutes of an acute anaphylactic episode. In the event that blood histamine may be considered useful, collect 5ml of whole blood in a Lithium Heparin tube. Blood should not be centrifuged. Whole blood must be frozen immediately and stored and transported frozen. Heparin prevents the clotting process, which may cause histamine release and metabolism. Most of the histamine present in blood is found within the white cells and trace levels of histamine or 1-methyl-histamine in plasma are undetectable.

TRANSPORT:
Histamine and metabolites are stable for several days at room temperature in the presence of antibacterial preservatives such as hydrochloric acid and consequently samples may be transported unfrozen. If the sample is to be stored for a period of time before being shipped, or transport to the laboratory below, is likely to take longer than three days, the sample should be stored frozen and transported frozen.
Samples should be sent to:
Specimen Reception
Institute of Pathology, Level 2, Block 5
The Children's Hospital at Westmead NSW 2145
Hawkesbury Road Westmead, NSW, Australia

24 HOUR URINE COLLECTION
FOR CATECHOLAMINES / HISTAMINE / 5-HIAA

Plan to start collecting urine at a certain time of day eg. 12 noon.
Begin diet restrictions 24 hours before starting the urine collection.

At the starting time have the patient pass urine and discard the urine. From this time onwards collect any urine in a clean plastic pot or container such as a clean ice-cream container and pour it into the specially provided plastic collection bottle which contains preservatives. Do not allow the patient to pass urine directly into the collection bottle as the chemical preservatives may cause irritation or burning. At the finishing time, 24 hours after starting the collection, have the patient pass the final portion of urine and add this to the collection bottle. If it has not been possible to collect urine for a full 24 hours, make a note of the collection time and inform the laboratory. Store the collecting bottle in a cool area, not in direct sunlight and when collection is finished return it to Sample Reception at the Institute of Pathology, Children's Hospital at Westmead.

If the completed collection cannot be returned within 3 days after collection it should be stored in a refrigerator to help preserve the sample until it can be returned to the Children's Hospital. If the patient is taking any medication during the diet and collection period, make a note and give details to the Laboratory. Vasodilator and salicylate drugs should be avoided if possible.

SPECIAL DIET

Urinary Catecholamine, Histamine & 5-HIAA Estimation

This special diet was designed by the Departments of Clinical Biochemistry and Nutrition and Dietetics and is suitable for both adults and children having urine collected for catecholamines, histamine or serotonin studies.

The diet must be followed for 24 hours prior to and also during the course of urine collection.
Avoid the following:
Fruit: Bananas, canned and fresh pineapple, plum, grapes, kiwifruit, avocado, cherries, blueberries, raspberries, strawberries, blackcurrants, oranges, guava, mango, passionfruit, dried fruit.
Jams: All except apricot.
Vegetables: Tomatoes, mushrooms, spinach, broccoli, brussel sprouts, cauliflower, eggplant, broadbeans, pickled vegetables eg sauerkraut.
Nuts & Seeds: All including peanut butter and tahini
Dairy: All cheeses and cheese spreads, yoghurt flavoured with nuts, muesli containing nuts or above fruits, chocolate yogo, banana strawberry and chocolate flavoured milk, fruit smoothies.
Fish & Seafood: All including canned, fried and salted fish and seafood.
Chocolate: All forms including Cocoa and Milo.
Processed Meats: All including devon, salami, sausages, ham, chicken loaf, turkey loaf.
Condiments: All chutneys and also malted or coloured vinegar, mayonnaise & tartare sauce.
Fermented Foods: Yeast extracts eg Marmite, Vegemite, fish paste, fish sauce, soy sauce, meat gravy.
Drinks: All wine and beer (all fermented beverages). Juices of all fruit listed above.

The following foods are allowed:
Rice: Brown or white, rice cakes – avoid any rice product containing nuts, seeds, fruit or flavouring as listed above.
Bread & Cereals: All plain bread and breakfast cereals, whole meal and white flour products except those containing nuts, seeds, fruit, flavourings or fillings as listed above.
Pasta: Including spaghetti or noodles. Avoid those containing nuts, seeds, fruit, flavouring or fillings as listed above eg. Avoid ravioli and coloured pastas.
Confectionery: Brown or white sugar. Boiled and jelly sweets.
Fresh Fruit: Apples, pears, apricots, peaches, rockmelon, watermelon.
Vegetables: All fresh vegetables not listed above.
Coconut: Including coconut milk.
Dairy: Fresh milk, fresh cream, vanilla yoghurt, plain ice cream and custard, (artificial) strawberry yogo.
Meats: All freshly prepared meats, including chicken.
Eggs: Whole eggs, egg white and yolk are allowed.
Spreads: Apricot jam and honey.
Condiments: Clear vinegar, vanilla, nutmeg, powdered stock (eg for gravy) may be used only if freshly prepared.
Drinks: Milk, milkshakes (vanilla, coffee, plain or caramel flavoured), lemonade, tea, coffee, apple juice.

SPECIAL MENU

Urinary Catecholamine, Histamine & 5-HIAA Estimation

Suggested Menu Plan for Catecholamine, Serotonin and Histamine Testing

Breakfast

Cornflakes, Rice Bubbles, Weetbix, Porridge, Rice Cereal and Milk
Poached Egg, Scrambled Egg, Boiled Egg, Fried Egg if desired
Toast (brown or white bread)
Butter or Margarine
Honey, Apricot Jam

Lunch
Sandwiches made using brown or white bread, eg, Chicken, Lamb, Chicken and Lettuce, Egg and Lettuce, Egg, Honey, Apricot jam (Check list for allowed fillings) Fresh Fruit, eg, Pear, Apple, Rockmelon, Watermelon or Canned Fruit, eg, Apple, Apricots, Peaches, Two Fruit, Pears Yoghurt – plain/vanilla

Main Meal

Soup made with allowed ingredients with plain bread roll or bread and butter or margarine Roast Chicken, Roast Lamb, Grilled Cutlets, Roast Beef, Crumbed Chicken Pieces, Grilled Chicken, Vegetable Curry (using allowed ingredients) or Egg (scrambled, poached, boiled, fried or plain omelette) May have gravy if made from powdered stock Mashed Potato, Baked Potato, Jacket Potato, Chips, Pasta, Boiled Rice Pumpkin, Peas, Beans, Carrots, Zucchini, Corn – check list for those allowed Salad – check list for those items allowed Fresh Fruit, eg, Pear, Apple, Rockmelon, Watermelon or Canned Fruit, eg, Apple, Apricots, Peaches, Two Fruit, Pears Yoghurt – plain/vanilla, Jelly, Custard, Creamy Rice

Snacks:

Biscuits, eg, Shredded Wheatmeal, Vitaweets, Saos, Jatz, Nice, Milk Arrowroot Popcorn (plain), Pikelets, English Muffins (plain), plain scones, crumpets, plain cake – no chocolate, nuts, dried fruit, banana or jam other than apricot Carrot or celery sticks Fresh Fruit, eg, Pear, Apple, Rockmelon, Watermelon or Canned Fruit, eg, Apple, Apricots, Peaches, Two Fruit, Pears

Drinks

Apple Juice, Lemonade Milk, Flavoured Milk (not chocolate) Milkshake (no chocolate flavouring) Tea, coffee