

Lab Updates

July 2009

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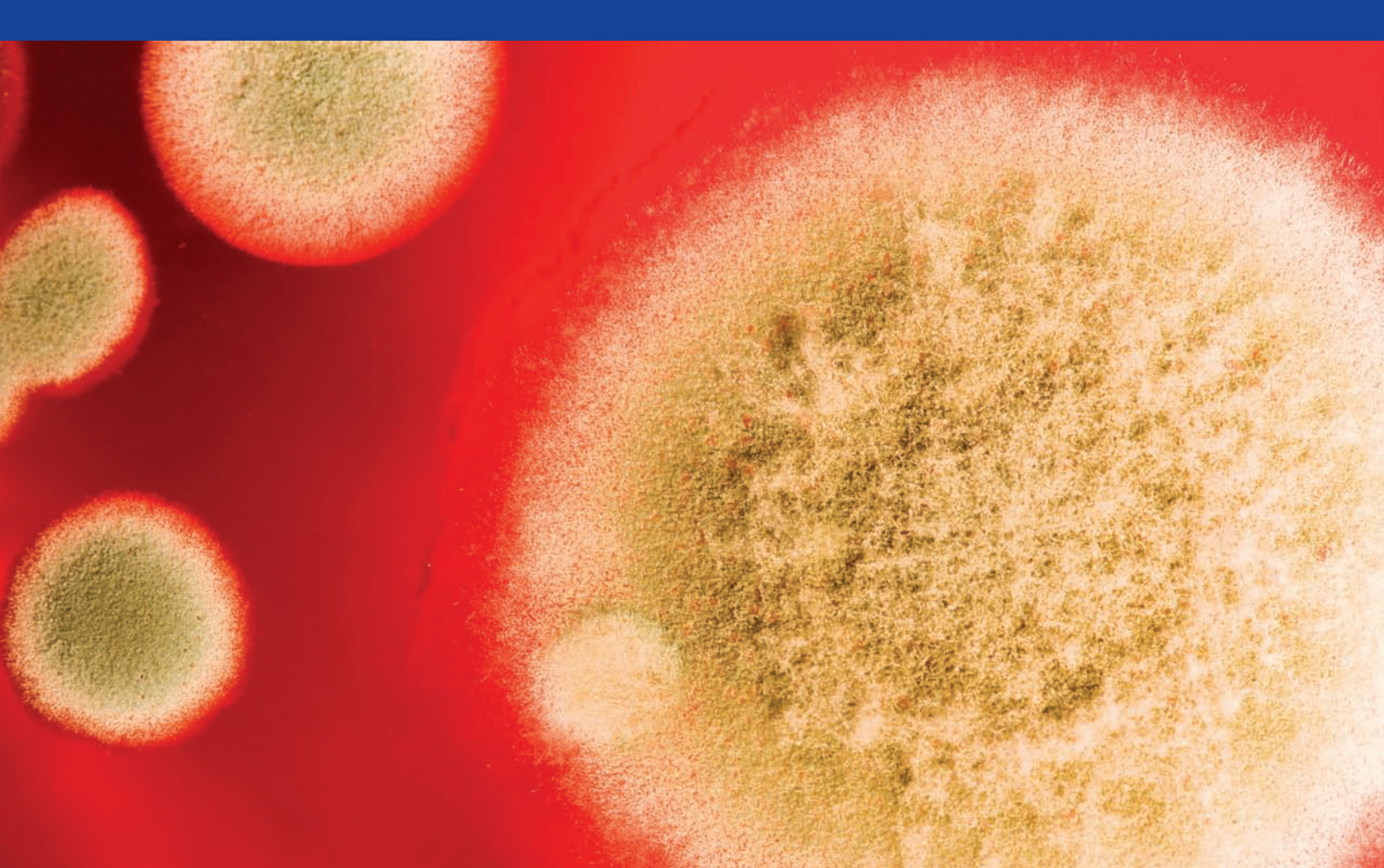
Specific Immunoglobulin E (IgE)
Allergen Tests

Spurious Hyperbilirubinemia
Caused by Naproxen



UMassMemorial
Laboratories

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Specific Immunoglobulin E (IgE) Allergen Tests

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ALLERGIC DISEASES ARE MANIFESTED AS HYPER RESPONSIVENESS in the target organ, whether skin, nose, lung or GI tract. Most tests for “allergy” are actually tests for allergic sensitization, or the presence of allergen-specific IgE. Most patients who experience symptoms upon exposure to an allergen have demonstrable IgE that specifically recognizes that allergen, making these tests essential tools in the diagnosis of allergic disorders.

The demonstration of sensitization is not sufficient to diagnose an allergy, however, because a sensitized individual may be entirely asymptomatic upon exposure to the allergen in question. Thus, allergy tests must be interpreted in the context of the patient’s specific clinical history, and the diagnosis of an allergic disorder cannot be based solely on a laboratory result. This is true for *in vitro* assays, as well as for skin testing.

In vitro testing for allergy has certain advantages:

- It poses no risk to the patient of an allergic reaction.
- It is not affected by medications (antihistamines etc) the patient may be taking.
- It is not reliant upon skin integrity or affected by skin disease.
- It can be more convenient for the patient. *In vitro* testing requires submitting a blood sample and does not necessitate a separate visit for skin testing.

The most commonly-used in vitro tests in hospital and commercial laboratories are immunoassays. Immunoassays are often incorrectly referred to collectively as “RAST tests,” because radioactive tests were the earliest immunoassays to be used extensively.

Immunoassays are both qualitative and quantitative. The best documented and validated systems are those reporting quantitative results in kUA/L for IgE directed against specific allergens, using calibrators traceable to the WHO International Reference Preparation for human IgE. Testing systems that report values in these units are preferable to those reporting results in other units. Results are additionally graded into classes (typically I to IV or I to VI) based upon arbitrary divisions of a reference curve. If the result is markedly positive (eg, a Class VI result), the history suggests a past reaction to the allergen, and the allergen is well-characterized, then the diagnosis of an allergy can usually be made without further evaluation. If the result is weakly positive, then further evaluation is usually needed. Skin testing and possible challenge may be indicated, based upon the patient's clinical history. A negative immunoassay result in the setting of a strongly suggestive history does NOT exclude allergy. In this situation, a skin prick test should be considered (if not contraindicated).

False positive results of allergen-specific IgE can theoretically occur in patients with extremely elevated total IgE levels. Tests used largely in research settings include immunoblotting, basophil histamine or leukotriene release tests, basophil activation, and levels of eosinophil mediators etc, are not standardized, and are generally not superior to skin testing, and cannot be recommended for routine clinical use. Allergen-specific IgG and IgG4 tests, which are believed to correlate with normal immunologic responses to foreign substances, are not useful in the diagnosis of IgE-mediated allergy, with the exception of venom allergy. Unreliable testing methods include provocation/neutralization tests, kinesiography, cytotoxic tests, and electro dermal testing.

UMass Memorial Laboratories uses quantitative “ImmunoCAP” methodology for the measurement of allergen specific IgE in serum. Its clinical performance expressed as sensitivity ranging from 84-95% and specificity ranging from 85-94% has been reported from different multicenter studies for a wide range of different allergens. No changes in specimen collection requirements (SST, Serum). One full SST tube can perform up to 20 individual allergens. Please find below various types specific panels, mixes as well as specific allergen tests currently performed.



Allergen Panel/Profiles (Immunoglobulin IgE)

APAD Adult Food Profile

| Mnemonic | Test Name |
|----------|----------------------|
| AF207 | Clam |
| AF3 | Codfish |
| AF8 | Corn |
| AF1 | Egg White |
| AF2 | Milk |
| AF13 | Peanut |
| AF338 | Scallop |
| AF10 | Sesame Seed |
| AF24 | Shrimp |
| AF14 | Soybean |
| AF256 | Walnut English/Black |
| AF4 | Wheat |
| IgE | IgE, Total |

APRE Respiratory Profile

| Mnemonic | Test Name |
|----------|---------------------------------------|
| AG2 | Bermuda Grass |
| AE1 | Cat Dander Epithelium |
| AI6 | Cockroach |
| AW1 | Common Ragweed |
| AE5 | Dog Dander |
| AT8 | Elm |
| AD2 | House Dust Mite (<i>D. Farinae</i>) |
| AW10 | Lamb's Quarter |
| AT1 | Maple (Box Elder) Tree |
| AM6 | Mold (<i>Alternaria Tenuis</i>) |
| AM2 | Mold (<i>Cladosporium Herbarum</i>) |
| AT7 | Oak |
| AG6 | Timothy Grass |
| IgE | IgE, Total |

APAS Asthma Profile

| Mnemonic | Test Name |
|----------|---|
| AE1 | Cat Dander Epithelium |
| AI6 | Cockroach |
| AW1 | Common Ragweed |
| AE5 | Dog Dander |
| AW9 | English Plantain |
| AD2 | House Dust Mite (<i>D. Farinae</i>) |
| AD1 | House Dust Mite (<i>D. Pteronyssinus</i>) |
| AM6 | Mold (<i>Alternaria Tenuis</i>) |
| AM5 | Mold (<i>Candida Albicans</i>) |
| AM2 | Mold (<i>Cladosporium Herbarum</i>) |
| AM4 | Mold (<i>Mucor Racemosus</i>) |
| AM1 | Mold (<i>Pencillium Notatum</i>) |
| AT7 | Oak |
| AG6 | Timothy Grass |
| IgE | IgE, Total |



Allergen Panel/Profiles (Immunoglobulin IgE)

APCH Childhood profile

| Mnemonic | Test Name |
|----------|---------------------------------------|
| AE1 | Cat Dander Epithelium |
| AF3 | Codfish |
| AF8 | Corn |
| AE5 | Dog Dander |
| AF1 | Egg White |
| AD2 | House Dust Mite (<i>D. Farinae</i>) |
| AF2 | Milk |
| AM6 | Mold (<i>Alternaria Tenuis</i>) |
| AM1 | Mold (<i>Pencillium Notatum</i>) |
| AF13 | Peanut |
| AF14 | Soybean |
| AF4 | Wheat |
| IGE | IGE, Total |



ANUT Nut Profile

| Mnemonic | Test Name |
|----------|-----------------------|
| AF20 | Almond |
| AF18 | Brazil Nut |
| AF202 | Cashew |
| AF17 | Hazelnut |
| AF13 | Peanut |
| AF201 | Pecan Nut |
| AF253 | Pine Nut Pignoles IGE |
| AF203 | Pistachio IGE |
| AF256 | Walnut English/Black |
| IGE | IGE, Total |

ANEP Northeastern Pollen

| Mnemonic | Test Name |
|----------|----------------------|
| AG17 | Bahia Grass |
| AG2 | Bermuda Grass |
| AT3 | Birch |
| AT57 | Cedar/Red Tree |
| AW14 | Common Pigweed IGE |
| AT8 | Elm |
| AW9 | English Plantain |
| AT4 | Hazelnut Tree |
| AT41 | Hickory White |
| AG8 | June (Kentucky Blue) |
| AW6 | Mugwort |
| AW20 | Nettle |
| AT7 | Oak |
| AW2 | Western Ragweed |
| AT15 | White Ash IGE |
| IGE | IGE, Total |

Allergen Mix Menu

| Mnemonic | Mix Name | Mix Composition |
|----------|--------------|---|
| AEP1 | Animal Mix 1 | Cat Dander Epithelium, Cow Dander, Dog Dander, Horse Dander |
| AFP1 | Food Mix 1 | Almond, Brazil Nut, Coconut, Hazelnut, Peanut |
| AFP2 | Food Mix 2 | Blue Mussel, Cod Fish, Salmon, Shrimp, Tuna |
| AFP3 | Food Mix 3 | Buck Wheat, Corn, Oat, Sesame Seed, Wheat |
| AFP5 | Food Mix 5 | Cod Fish, Egg White, Milk, Peanut, Soybean, Wheat |
| AGP1 | Grass Mix 1 | June (Kentucky Blue), Meadow Fescue, Orchard Grass, Perennial Rye Grass, Timothy Grass |
| AGP2 | Grass Mix 2 | Bahia Grass, Bermuda Grass, Johnson Grass, June (Kentucky Blue), Perennial Rye Grass, Timothy Grass |
| AGP3 | Grass Mix 3 | Cultivated Rye Grass, Perennial Rye Grass, Timothy Grass, Sweet Vernal Grass, Velvet Grass |
| AGP4 | Grass Mix 4 | Common Red Grass, Cultivated Rye Grass, Perennial Rye Grass, Sweet Vernal Grass, Velvet Grass |
| AHP1 | Dust Mix 1 | Cockroach, D. Farinae, D. Pteronyssinus, Hollister-Stier |
| AMP1 | Mold Mix | Alternaria Tenuis, Aspergillus Fumigatus, Cladosporium Herbarum, Penicillium Notatum |
| ATP1 | Tree Mix 1 | Birch, Elm, Maple, Oak, Walnut |
| ATP2 | Tree Mix 2 | Cottonwood, Elm, Maple, Oak, Pecan |
| ATP4 | Tree Mix 4 | Cottonwood, Elm, Oak, Sycamore, Willow |
| ATP9 | Tree Mix 9 | Alder, Birch, Hazlenut, Oak, Willow |
| AWP1 | Weed Mix 1 | Common Ragweed, English Plantain, Lamb's Quarter, Mugwort, Russian Thistle |
| AWP2 | Weed Mix 2 | English Plantain, Lamb's Quarter, Mugwort, Scale, Western Ragweed |



Specific Immunoglobulin E (IgE) Allergen Tests

Allergen Class: Weeds

| Mnemonic | Allergen Test |
|----------|------------------|
| AW13 | Cocklebur |
| AW14 | Common Pigweed |
| AW1 | Common Ragweed |
| AW8 | Dandelion |
| AW9 | English Plantain |
| AW3 | Giant Ragweed |
| AW12 | Goldenrod |
| AW10 | Lamb's Quarter |
| AW6 | Mugwort |
| AW20 | Nettle |
| AW7 | Ox-Eye Daisy |
| AW11 | Russian Thistle |
| AW15 | Scale |
| AW18 | Sheep Sorrel |
| AW2 | Western Ragweed |



Allergen Class: House Dust

| Mnemonic | Allergen Test |
|----------|------------------------------|
| AH1 | House Dust (Greer) |
| AH2 | House Dust (Hollister-Stier) |

Allergen Class: Mites

| Mnemonic | Allergen Test |
|----------|---|
| AD1 | House Dust Mite (<i>D. Pteronyssinus</i>) |
| AD2 | House Dust Mite (<i>D. Farinae</i>) |
| AD70 | House Dust Mite (<i>Acarus Siro</i>) |

Allergen Class: Occupational

| Mnemonic | Allergen Test |
|----------|---------------|
| AK82 | Latex |

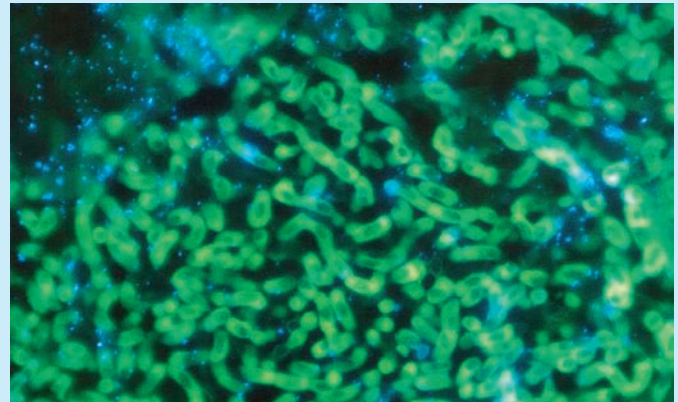
Allergen Class: Animals

| Mnemonic | Allergen Test |
|----------|-----------------------|
| AE1 | Cat Dander Epithelium |
| AE85 | Chicken Feathers |
| AE4 | Cow Dander |
| AE5 | Dog Dander |
| AE2 | Dog Epithelium |
| AE80 | Goat Epithelium |
| AE70 | Goose Feathers |
| AE6 | Guinea Pig Epithelium |
| AE84 | Hamster Epithelium |
| AE3 | Horse Dander |
| AE88 | Mouse |
| AE71 | Mouse Epithelium |
| AE213 | Parrot Feathers |
| AE82 | Rabbit Epithelium |
| AE87 | Rat |
| AE73 | Rat Epithelium |
| AE81 | Sheep Epithelium |
| AE83 | Swine Epithelium |

Specific Immunoglobulin E (IgE) Allergen Tests

Allergen Class: Grass

| Mnemonic | Allergen Test |
|----------|----------------------|
| AG17 | Bahia Grass |
| AG9 | Bent/Redtop Grass |
| AG2 | Bermuda Grass |
| AG7 | Common Reed Grass |
| AG12 | Cultivated Rye Grass |
| AG10 | Johnson Grass |
| AG8 | June (Kentucky Blue) |
| AG4 | Meadow Fescue |
| AG3 | Orchard Grass |
| AG5 | Perennial Rye Grass |
| AG1 | Sweet Vernal Grass |
| AG6 | Timothy Grass |
| AG13 | Velvet Grass |



Courtesy of Department of Health and Human Services Public Health Image Library (PHIL)

Allergen Class: Molds

| Mnemonic | Allergen Test |
|----------|------------------------|
| AM6 | Alternaria Tenuis |
| AM3 | Aspergillus Fumigatus |
| AM5 | Candida Albicans |
| AM2 | Cladosporium Herbarum |
| AM16 | Curvularia Lunata |
| AM14 | Epicoccum Purpurascens |
| AM9 | Fusarium Moniliforme |
| AM8 | Helmin Halodes |
| AM4 | Mucor Racemosus |
| AM1 | Penicillium Notatum |
| AM13 | Phoma Betae Mold |
| AM12 | Pullularia Pullulans |
| AM11 | Rhizopus Nigricans |
| AM10 | Stemphylium Botryosum |

Allergen Class: Tree

| Mnemonic | Allergen Test |
|----------|------------------------|
| AT19 | Acacia |
| AT2 | Alder |
| AT73 | Australian Pine |
| AT5 | Beech |
| AT3 | Birch |
| AT212 | Cedar |
| AT57 | Cedar/Red Tree |
| AT14 | Cottonwood |
| AT8 | Elm |
| AT18 | Eucalyptus |
| AT4 | Hazelnut Tree |
| AT41 | Hickory White |
| AT1 | Maple (Box Elder) Tree |
| AT21 | Melaleuca |
| AT20 | Mesquite |
| AT6 | Mountain Cedar |
| AT7 | Oak |
| AT9 | Olive |
| AT22 | Pecan Tree |
| AT11 | Sycamore |
| AT10 | Walnut Tree |
| AT15 | White Ash |
| AT70 | White Mulberry |
| AT16 | White Pine |
| AT12 | Willow |

Specific Immunoglobulin E (IgE) Allergen Tests



Allergen Class: Foods

| Mnemonic | Allergen Test |
|----------|--------------------|
| AF339 | Allspice |
| AF20 | Almond |
| AF76 | Alpha Lactalbumin |
| AF49 | Apple |
| AF237 | Apricot |
| AF262 | Aubergine Eggplant |
| AF96 | Avocado |
| AF45 | Baker's Yeast |
| AF92 | Banana |
| AF6 | Barley |
| AF269 | Basil |
| AF278 | Bayleaf |
| AF27 | Beef |
| AF77 | Beta Lactoglobulin |
| AF280 | Black Pepper |
| AF37 | Blue Mussel |
| AF288 | Blueberry |
| AF18 | Brazil Nut |
| AF260 | Broccoli |
| AF11 | Buck Wheat |
| AF93 | Cacao |
| AF31 | Carrot |
| AF78 | Casein |

Allergen Class: Foods

| Mnemonic | Allergen Test |
|----------|--------------------|
| AF202 | Cashew |
| AF291 | Cauliflower |
| AF85 | Celery |
| AF81 | Cheese Cheddar |
| AF242 | Cherry |
| AF299 | Chestnut |
| AF83 | Chicken Meat |
| AF309 | Chickpea |
| AF279 | Chili Pepper |
| ARF220 | Cinnamon |
| AF207 | Clam |
| AF36 | Coconut |
| AF3 | Codfish |
| AF317 | Coriander/Cilantro |
| AF8 | Corn |
| AF23 | Crab |
| AF320 | Crayfish |
| AF244 | Cucumber |
| AF281 | Curry Powder |
| AF277 | Dill |
| AF1 | Egg White |
| AF75 | Egg Yolk |
| AF254 | Flounder Plaice |
| AF47 | Garlic |
| AF79 | Gluten |
| AF259 | Grape |
| AF209 | Grapefruit |
| AF315 | Green Bean |
| AF12 | Green Pea |
| AF42 | Haddock |
| AF303 | Halibut |
| AF17 | Hazelnut |
| AF287 | Kidney Bean |
| AF84 | Kiwi Fruit |
| AF208 | Lemon |

Specific Immunoglobulin E (IgE) Allergen Tests

Allergen Class: Foods

| Mnemonic | Allergen Test |
|----------|----------------------|
| AF235 | Lentil |
| AF215 | Lettuce |
| AF306 | Lime |
| AF80 | Lobster |
| AF345 | Macadamia Nut |
| AF90 | Malt |
| AF91 | Mango Fruit |
| AF87 | Melon |
| AF2 | Milk |
| AF212 | Mushroom |
| AF89 | Mustard |
| ARF282 | Nutmeg |
| AF7 | Oat |
| AF48 | Onion |
| AF33 | Orange |
| AF283 | Oregano |
| AF290 | Oyster |
| AF293 | Papaya |
| AF218 | Paprika/Sweet Pepper |
| AF86 | Parsley |

Allergen Class: Foods

| Mnemonic | Allergen Test |
|----------|----------------------|
| AF95 | Peach |
| AF13 | Peanut |
| AF94 | Pear |
| AF201 | Pecan Nut |
| AF253 | Pine Nut Pignoles |
| AF210 | Pineapple |
| AF203 | Pistachio |
| AF255 | Plum |
| AF26 | Pork |
| AF35 | Potato |
| AF343 | Raspberry |
| AF9 | Rice |
| AF5 | Rye |
| AF344 | Sage |
| AF41 | Salmon |
| AF338 | Scallop |
| AF10 | Sesame Seed |
| AF24 | Shrimp |
| AF14 | Soybean |
| AF214 | Spinach |
| AF258 | Squid |
| AF44 | Strawberry |
| AF54 | Sweet Potato |
| AF312 | Swordfish |
| AF273 | Thyme |
| AF25 | Tomato |
| AF204 | Trout |
| AF40 | Tuna |
| AF284 | Turkey |
| AF234 | Vanilla |
| AF256 | Walnut English/Black |
| AF329 | Watermelon |
| AF4 | Wheat |
| AF236 | Whey |
| AF15 | White Bean |



Specific Immunoglobulin E (IgE) Allergen Tests



Allergen Class: Insects/Venoms

| Mnemonic | Allergen Test |
|----------|---------------------|
| AI6 | Cockroach |
| AI1 | Honey Bee Venom |
| AI4 | Paper Wasp Venom |
| AI2 | White Faced Hornet |
| AI5 | Yellow Hornet |
| AI3 | Yellow Jacket Venom |

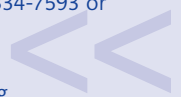
Allergen Class: Miscellaneous

| Mnemonic | Allergen Test |
|----------|----------------|
| IGE | IGE, Total |
| AK84 | Sunflower Seed |

If you have questions, comments or suggestions, please contact:

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Spurious Hyperbilirubinemia Caused by Naproxen

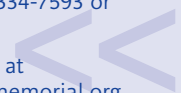
A metabolite of Naproxen, O-desmethylnaproxen (ODMN), has been shown to interfere with the measurements of total bilirubin. Naproxen, a derivative of naphthalene, is a commonly prescribed non steroidal anti-inflammatory drug (NSAID). In humans naproxen metabolites include the major metabolite ODMN, two distinct acyl glucuronide forms of the parent drug, and various ODMN conjugated acyl glucuronide forms. In the plasma most of the drug remains as unconjugated naproxen with unconjugated ODMN levels 100 times

less than those of naproxen. When evaluating high levels of total bilirubin from patients who have taken naproxen, the above interference should be considered.

If you have questions, comments or suggestions, please contact:

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Photo: Kevin Vance

UMass Memorial Laboratories operates three laboratories in Worcester, Massachusetts, including a regional laboratory that is located in 38,000 square feet of state-of-the-art lab space in the Biotech Park, as well as laboratories at the University campus and Memorial campus of UMass Memorial Medical Center.