

INSECT ALLERGY

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Definition

An immunological reaction occurring in contact with insects

- IgE mediated reaction after insect bite
- Respiratory and contact allergies to insects
- Allergy to the bites of blood-sucking insects

Prevalence

- Adults 2-20%
- Medical history for anaphylactic reactions – 1-5%
- In the general population, 3% of adults and less than 1% of children have systemic reactions
- Wasp stings are more common in males than in females, likely because of increased occupational and recreational exposure in men

Etiology

Severe and life-threatening allergic reactions are caused by insects from Hymenoptera: honeybee (*Apis mellifera*); Axes (*Polistes*, Wasps), Hornet (*Vespula*)

In USA: Yellow jacket, Fire ants



YELLOW
JACKET



HONEYBEE



PAPER
WASP



HORNET

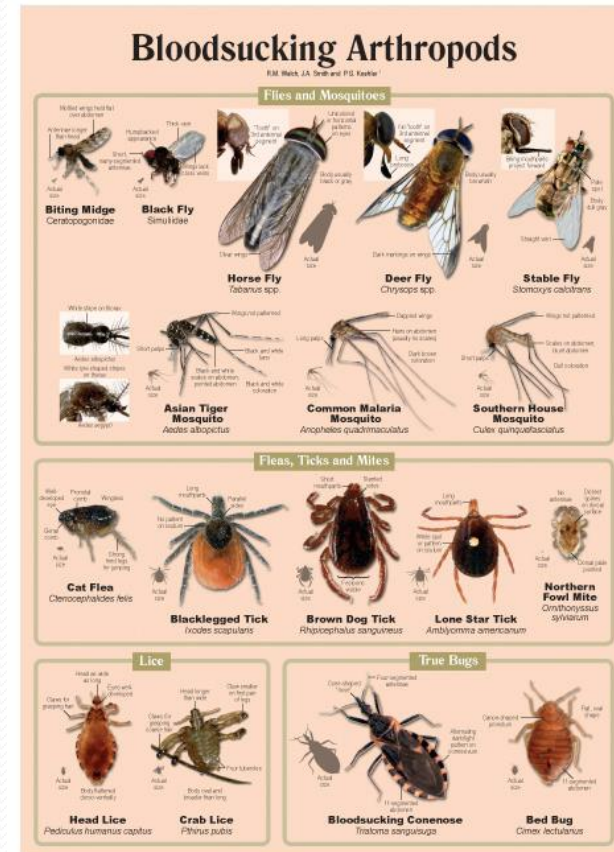


FIRE ANT

Etiology

Allergy to bites of blood-sucking insects

Ticks, mosquitoes, fleas, blood-sucking flies



SP-418
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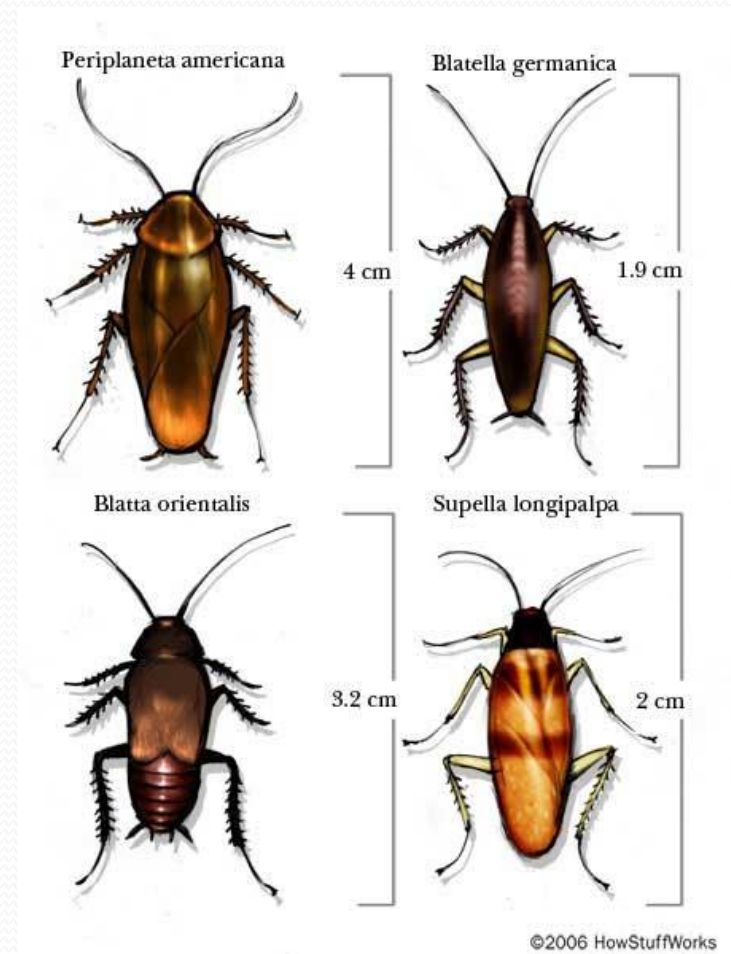
*Include identification of Pesticides, respectively, IFAS, Entomology and Planting Services
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Respiratory and Contact Allergies to Insects

Moths

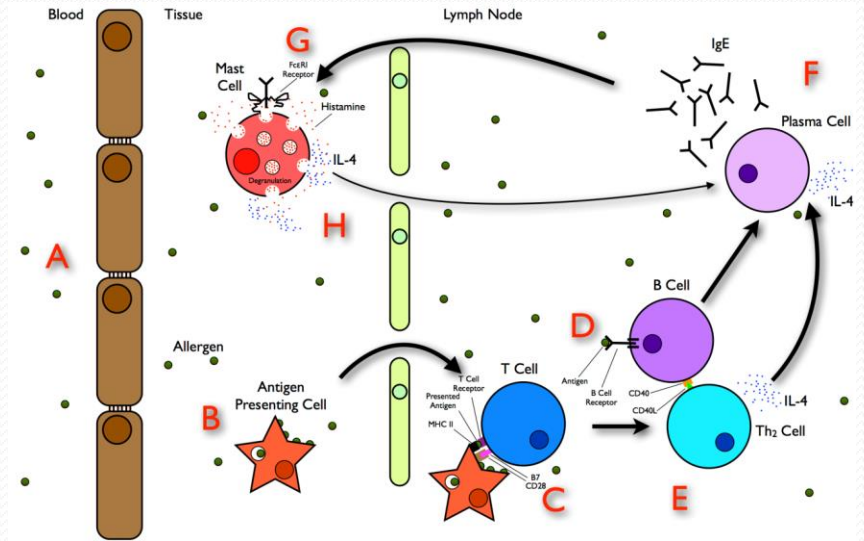
Bees

Cockroaches



Pathophysiology

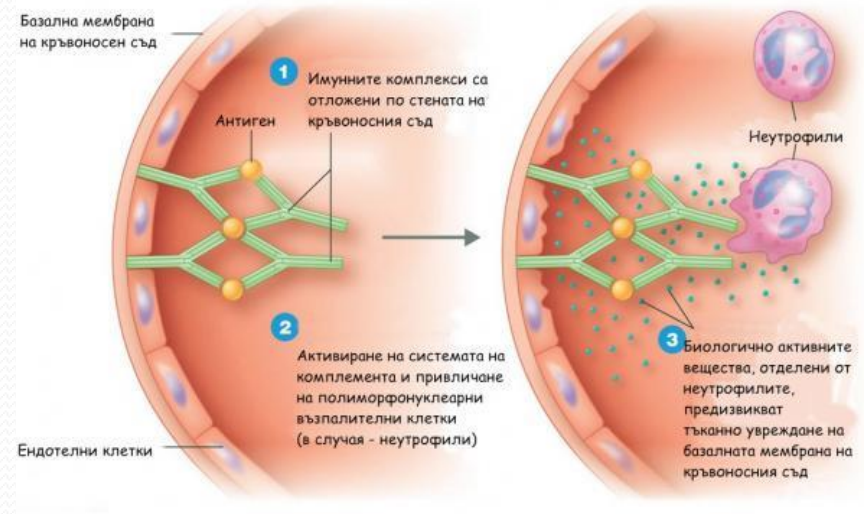
Hypersensitivity of I-st type – IgE mediated



Pathophysiology

Hypersensitivity of III type

Atypical clinical manifestations may occur – arthritis, encephalitis, vasculitis

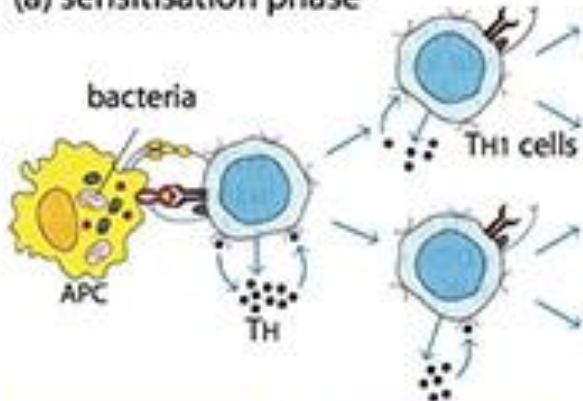


Pathophysiology

Hypersensitivity of IV type- cell mediated
Clinical Manifestation- Dermatitis Contacta

Pathogenesis of type IV hypersensitivity

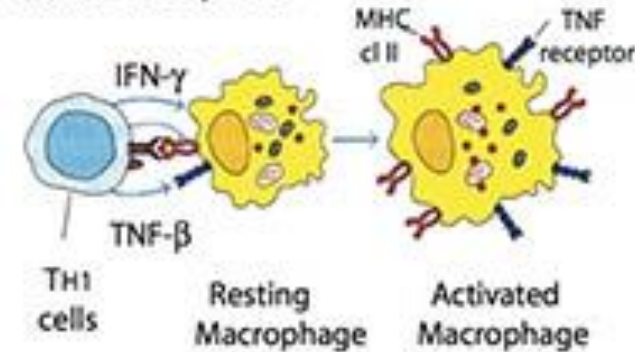
(a) sensitisation phase



APCs:
Macrophages

DTH Cells:
TH1

(b) effector phase



TH1 products:
IFN- γ , TNF- β , IL-2, IL-3,
IL-8, MCAF, MIF

Macrophage activation:
MHC class II, TNF receptor,
oxygen radicals, nitric oxide

Pharmacological Agents and Allergens

Bee venom

Proteins (enzymes)

- Phospholipase A₂
- Hyaluronidase
- Phospholipase B
- Phosphatase
- α - Glucosidase

Peptides

- Melittin
- Apamine

Biogenic amines

- Histamine
- Dopamine
- Noradrenalin

Phospholipids

Amino acids

Volatiles (pheromones)

Sugars and Minerals



Wasp venom

Phospholipase A₂

Serotonin

Hyaluronidase

Acetylcholine

Phospholipase B



Phospholipase A₁

Dopamine

Histamine

Serotonin

Hyaluronidase



Clinical Manifestation

Normal reaction

IgE mediated

Local reaction

Systemic reaction

Severe systemic or anaphylactic reaction

Non- IgE mediated (immunocomplex)

Vasculitis

Arthritis

Encephalitis

Heavy Local Reaction

After a sting the redness does not remain local, but expands over the extremities. The swellings can be very painful and can persist for a longer period of time (24-48 hours) even a week.



Systemic Reaction

The first symptoms arise a few minutes after the sting

The main symptoms are redness, swelling and itching

They can be accompanied by strong swelling of the face

Shivering, vomiting, nausea, shortage of breath

life endangering collapse of blood circulation can occur – the anaphylactic shock.



Unusual Reactions

Vasculitis

Arthritis

Encephalitis

Guillain-Barre syndrome

Immunotherapy is not recommended!!!!

Diagnosis

Medical history

Type of insect

Physical signs

- Local reaction
- Generalized urticarial reaction
- Angioedema
- Anaphylaxis

Laboratory Tests

Skin prick test

Specific IgE test

Patients with negative SPT 6 weeks after the sting and history for systemic reaction should be tested again for specific IgE (SPT or in vitro test or both)

Laboratory Tests

CBC count, electrolytes, BUN and creatinine, glucose, and liver function studies

Patients may have mild leukocytosis related to demargination from catecholamine release

Arterial blood gas values

Chest radiography in patients who present with dyspnea or chest tightness or who have an anaphylactic episode after a sting

Laboratory Tests

ECG on patients who experience palpitations, chest tightness, dyspnea, or lightheadedness after a sting

A baseline peak flow measurement in patients who present with wheezing, dyspnea, or prolongation of the expiratory phase of respiration after a sting

Flexible fiberoptic visualization of the larynx and vocal chords to exclude laryngeal edema or spasm

Treatment

Prehospital care

- Removal of sting
- Cooling
- Adrenaline s.c. or autoinjector with 300 µcg, 150 µcg (Anapen, EpiPen)
- Oral H₁ blocker

Airway Management

Check the airway

Assess the level of consciousness and obtain blood pressure, pulse, and oximetry values

Place the patient in the supine position with legs elevated, and begin supplemental oxygen

Cricothyrotomy

Hospital Care

Systemic reaction

Epinephrine: 0.3-0.5 mL subcutaneously in a 1:1000 solution. The procedure should be repeated several times in 15 min.

Dose for children: 0,01 ml/kg

Epinephrine – i.m. or i.v.

Fluid resuscitation with Isotonic crystalloid solutions (ie, normal saline, Ringer lactate)

Hospitalization for 24 hours (risk of biphasic anaphylaxis)



Antihistamines - much slower onset of action than epinephrine. Minimal effect on blood pressure, and they should not be administered alone

Corticosteroids - no immediate effect on anaphylaxis. Administer them early to try to prevent a potential late-phase reaction (biphasic anaphylaxis).

Desensitisation

Desensitisation is absolutely recommended from three to five years

Success of the desensitisation against bee venom is about 80 %

Success against wasp venom allergy is approx. 95 %



Prophylaxis

Avoid contact with insects

Education about behavior in case of insect sting

Always with auto-injector

Avoidance of bright colored clothes, strong perfumes

Recommended color clothes: khaki, tobacco, green, white

Bracelet, necklace indicating allergy



