Anaphylaxis
AAPA 2021

Brian Bizik MS PA-C
Asthma and COPD Care Coordinator
Terry Reilly Health Centers

Past President and current conference chair – American Academy of Physician Assistants in Allergy, Asthma and Immunology

brianbizik@yahoo.com
208-404-5338

Disclosures

TEACHING
Idaho State University PA and NP Programs
ThriveAP

INDUSTRY AFFILIATIONS
Grifols Pharmaceutical - speaker, consultant
Boehringer Ingelheim Pharmaceuticals – consultant, speaker
Meda Pharmaceuticals – speaker, consultant
Circassia Pharmaceuticals – advisory panel
Genentech Pharmaceuticals - Speaker

CLINICAL RESEARCH
2017 – Sub-I, Genentech Zenyatta Severe Asthma Study
2016 – Sub-I, Biota Human Rhinovirus Study
2015 – Sub-I, Sanofi Traverse Severe Asthma Study
2015 – Sub-I, Sanofi Liberty Severe Asthma Study
2013 – Study Coordinator: MediVector Influenza Study

Brian Bizik does not intend to discuss the use of any off-label use/unapproved use of drugs or devices that he represents

ANAPHYLAXIS

In a few seconds it was extremely ill;

breathing became distressful and panting;

it could scarcely drag itself along, lay on its side, was seized with diarrhea, vomited blood and died in twenty five minutes.

Charles Richet 1902

ANAPHYLAXIS

Instead of inducing tolerance (prophylaxis), **Richet's** experiments in dogs injected with sea anemone toxin resulted in lethal responses to doses previously tolerated.
He coined the word 'ana' (without) 'phylaxis (protection). He won the Nobel prize for this work.

L F HAAS J Neurol Neurosurg Psychiatry 2001;70:255

Definition of Anaphylaxis

- An acute allergic reaction resulting in widespread allergic symptoms which involves two or more organ systems, and is potentially life-threatening, resulting from an **IgE**-mediated mechanism.

- Anaphylactoid – term falling into disuse but meant to describe anaphylaxis without **IgE** involvement ie a non-allergic mechanism.

- Anaphylaxis now describes a clinical event, regardless of mechanism

Current Definition of Anaphylaxis

- **Short practical form – 'Anaphylaxis is a serious allergic reaction that is rapid in onset and may cause death'**

IS THIS ANAPHYLAXIS?

12 YO MALE with an insect sting (stung once) at a park. Had the following:

Hives, tongue felt thick but did not look swollen

Cough, a bit of a wheeze and chest felt tight

Runny nose and sneezed once

Felt nausea and like “he was going to throw up”

Hands and feet felt swollen

IS THIS ANAPHYLAXIS?

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IS THIS ANAPHYLAXIS?

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Hives, tongue felt thick but did not look swollen

WHO ARE THE PLAYERS?

What brings this on?

Mast Cell

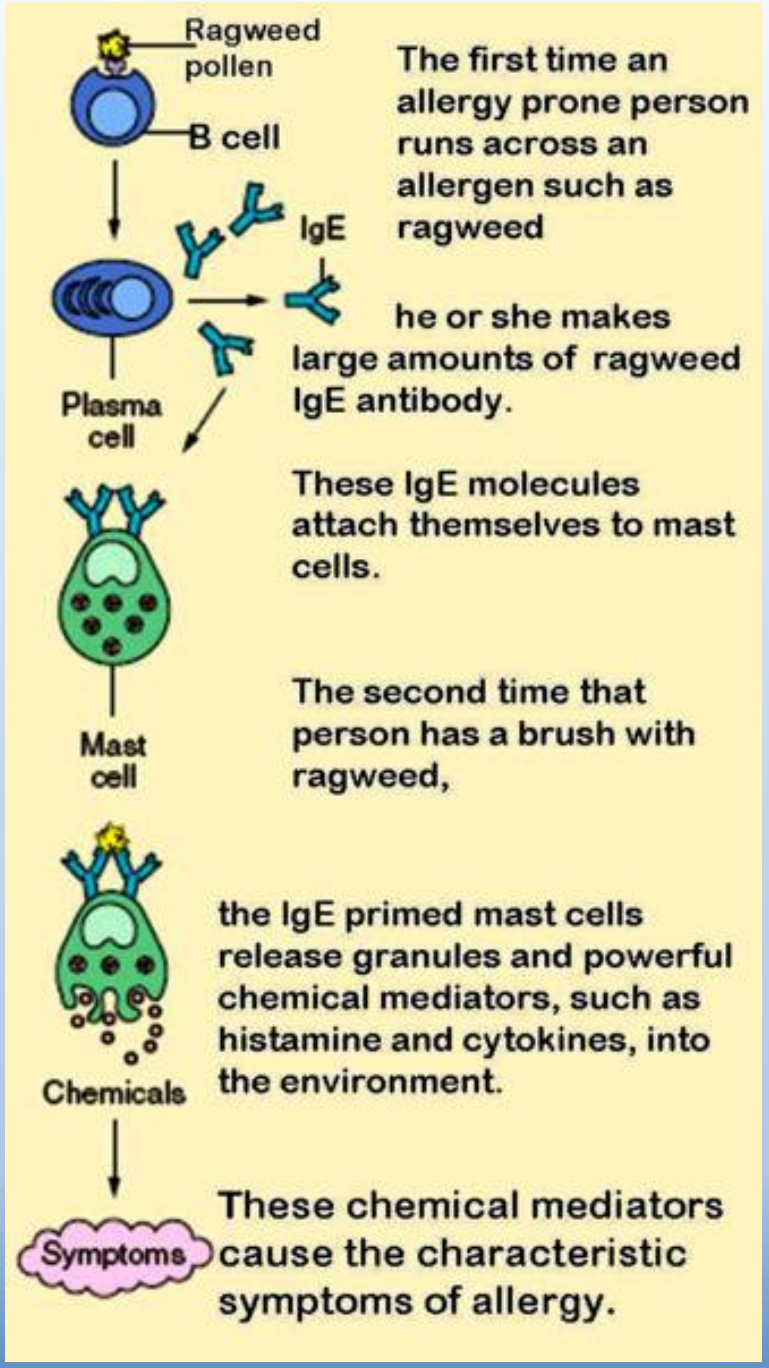
- Mast cells are abundant in the mucosa of the respiratory, gastrointestinal tracts and in the skin

- Mast cells release mediators that cause the pathophysiology of the immediate and late phases of atopic diseases.
- Histamine is the major player but there are many others

Mechanism

- While first-time exposure may only produce a mild reaction, repeated exposures may lead to more serious reactions. Once a person is sensitized (has had a previous sensitivity reaction), even a very limited exposure to a very small amount of allergen can trigger a severe reaction.

- Most occur within seconds or minutes after exposure to the allergen, but some can occur after several hours, particularly if the allergen causes a reaction after it is partially digested. In very rare cases, reactions develop after 24 hours.



The first time an allergy prone person runs across an allergen such as ragweed

he or she makes large amounts of ragweed IgE antibody.

These IgE molecules attach themselves to mast cells.

The second time that person has a brush with ragweed,

the IgE primed mast cells release granules and powerful chemical mediators, such as histamine and cytokines, into the environment.

These chemical mediators cause the characteristic symptoms of allergy.

So, Mast cells dump stuff, how much?

This is hard to answer, may be related to the exposure (one sting vs many)

Maybe it's the enviornement – hot outside

Maybe it's the set up – exercising, sex . . . .

Already had some exposure? Allergy is additive

Let's define this event -

TWO OR MORE OF THE FOLLOWING that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):

A. Involvement of the skin-mucosal tissue (eg, generalized hives, itch-flush, swollen lips-tongue-uvula)

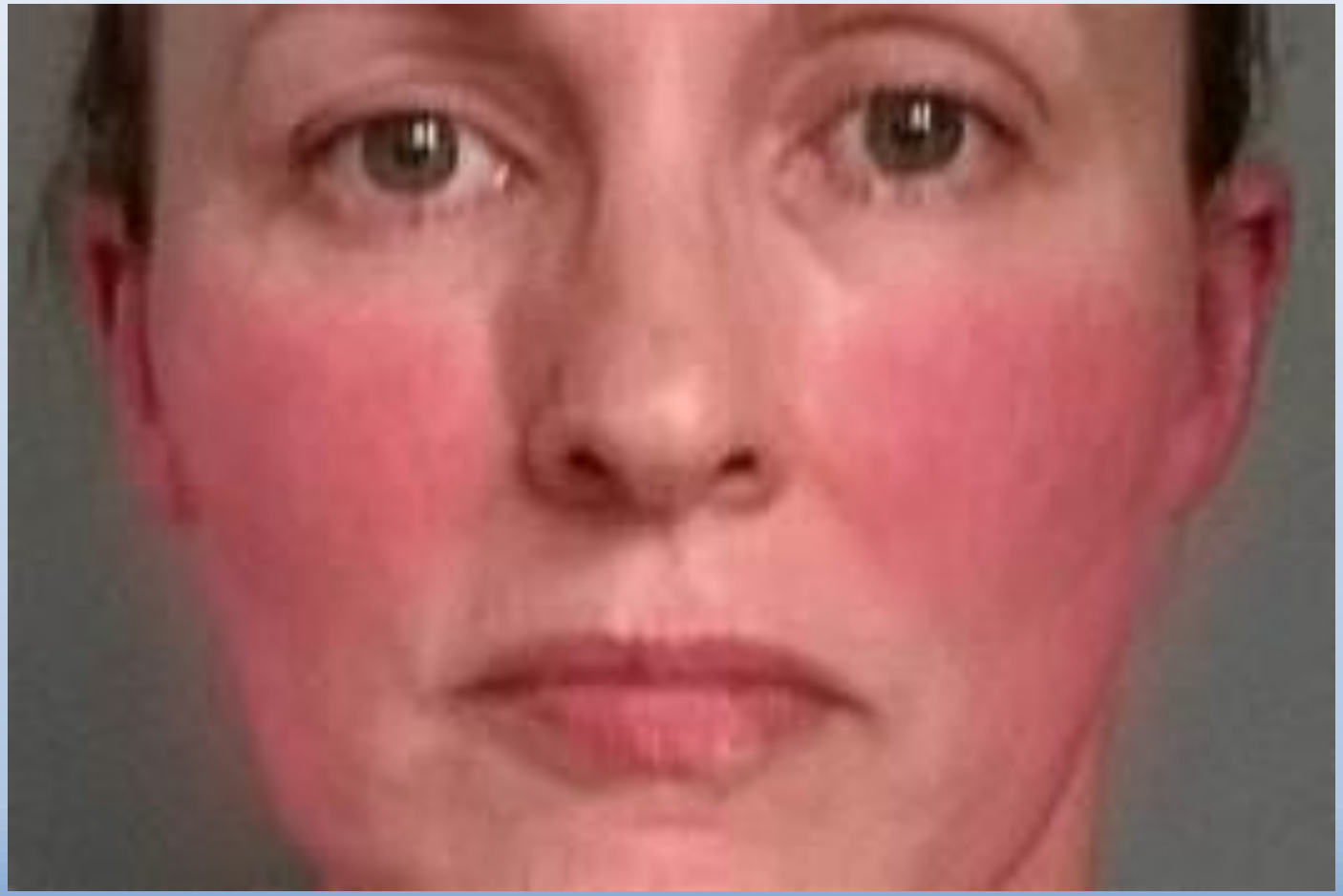
B. Respiratory compromise (eg, dyspnea, wheeze-bronchospasm, stridor, reduced PEF in older children and adults, hypoxemia)

C. Reduced BP or associated symptoms (eg, hypotonia, collapse, syncope, incontinence)

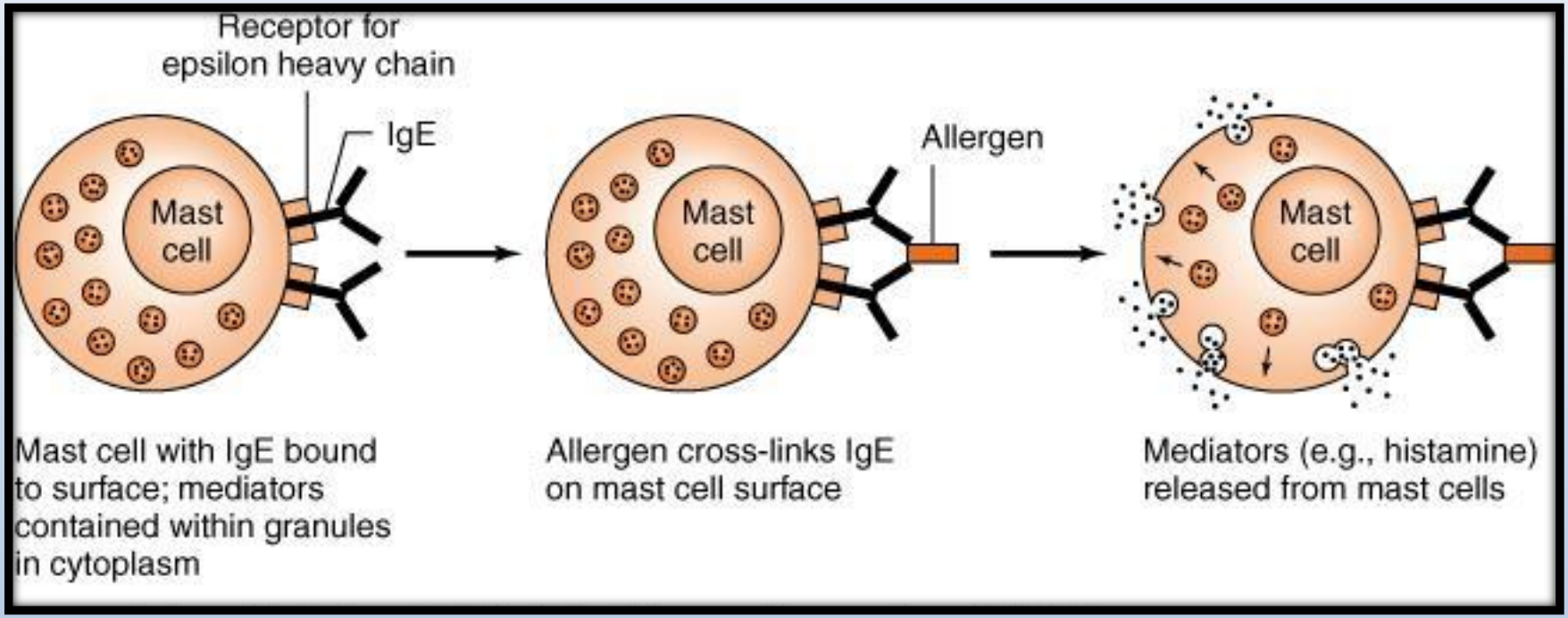
D. Persistent gastrointestinal symptoms (eg, crampy abdominal pain, vomiting)

Quick Example

- This happened 3 weeks ago
- 48 Y O Female, known sensitivity to sunflower seeds takes a bite of a granola bar without reading ingredients.
- Walks over (she works in administration next to my clinic) and looks like this:



- Facial flushing
- Feels like her tongue might be getting bigger but not sure.
- No GI symptoms, no cough, wheeze, stridor, not itching anywhere, drank water without a problem
- Anaphylaxis???


Receptor for
epsilon heavy chain
IgE
Mast
cell
Allergen
Mast
cell
Mast
cell
Mast cell with IgE bound
to surface; mediators
contained within granules
in cytoplasm
Allergen cross-links IgE
on mast cell surface
Mediators (e.g., histamine)
released from mast cells

IgE Mediated Allergic Reactions

- Allergen bridges 2 molecules of IgE causing mediator release
- **Early phase manifestations** are due to release of preformed mediators , **histamine** & **tryptase**, and newly generated **leukotrienes,** which cause
- **vasodilation** and **increased vascular permeability, itching, sneeze** and **bronchospasm**

- **Late phase manifestations** are due to recruitment of **eosinophils**, neutrophils & TH2 cells and other inflammatory cells 4-12 hrs later due to cytokines released in the early phase
- As well , **interleukin 4** formed by **mast cells** can stimulate further production of IgE and potentiate other allergic reactions

EARLY	LATE PHASE
Immediate symptoms (mins to few hrs) due to mediator release	Begins 4-12 hrs after allergen exposure due to inflammatory cell influx
Allergic rhinitis – rhinorrhea, sneeze, itch Asthma – **bronchospasm, wheeze, dyspnea** Urticaria – **short lived lesions < 24 hrs, responds well to antihistamines** Anaphylaxis – occurs	Allergic rhinitis – nasal congestion Asthma – **increased bronchial irritability and inflammation with increased tendency to asthma flareups and increased severity** **Urticaria-lesions last >24 hrs, poor response to antihistamines** Anaphylaxis -No late phase

EARLY	LATE PHASE
Responds to symptom-relief therapy **antihistamines for urticaria and rhinitis;** **bronchodilators for bronchospasm**	Limited response to symptom-relief therapy
Response to steroids – minimal for acute relief **but symptoms subside with control of late phase reaction and its effects on target cells**	Responds to steroids

ACTIONS OF HISTAMINE

- ***Peripheral vasodilation***
- ***Increased vascular permeability***
- ***Altered cardiac conduction***
- ***Bronchial/intestinal smooth muscle contraction***
- ***Nerve stimulation-Cutaneous pruritus/pain***
- ***Increased glandular mucus secretions***

CLINICAL MANIFESTATIONS OF ALLERGY

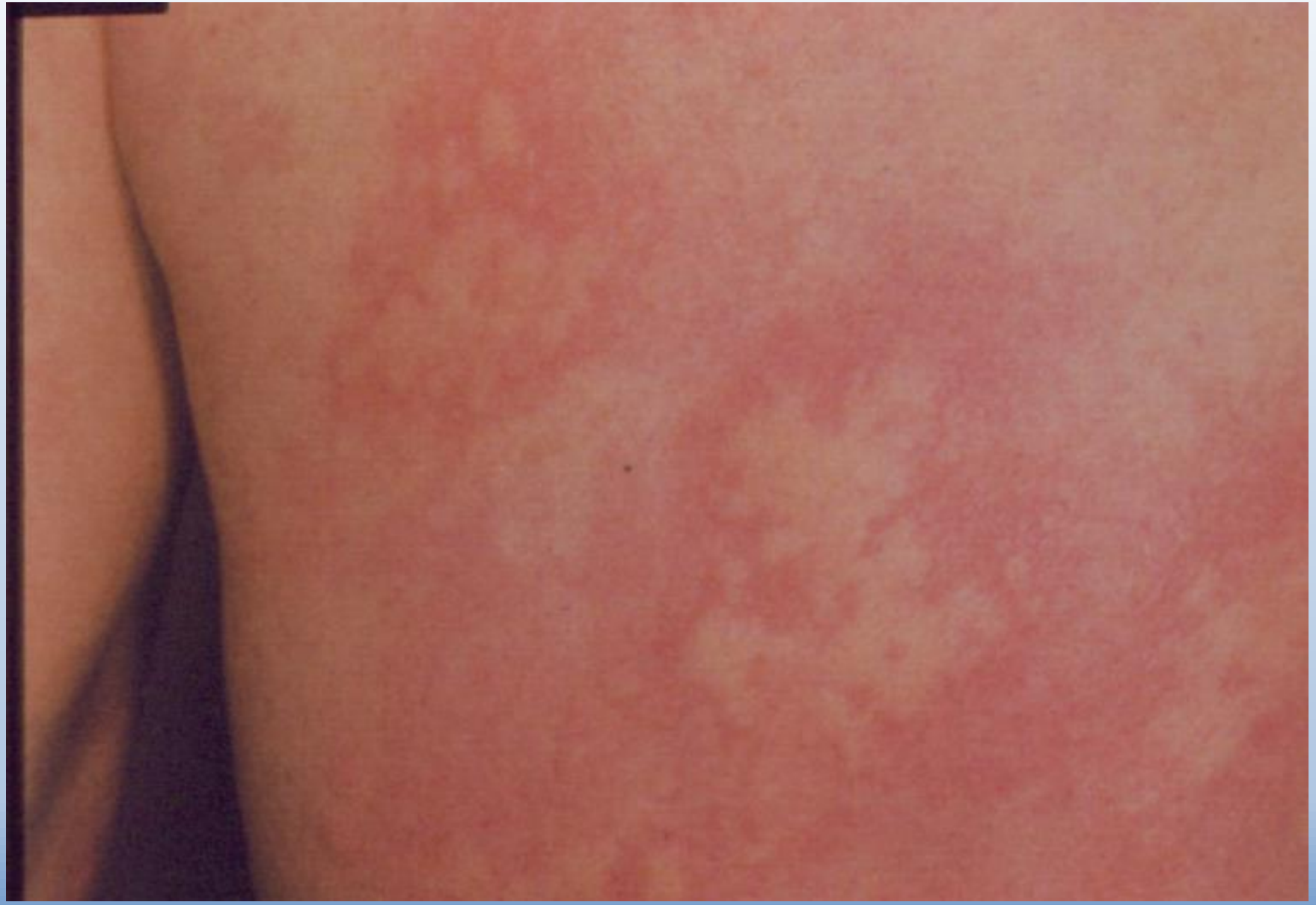
- Knowing the actions of histamine and other mediators , what would you predict to be the clinical effects on the body?

CLINICAL MANIFESTATIONS OF ALLERGY

- ***Vasodilation – erythema, nasal congeston, hypotension, anaphylaxis***
- ***Increased vascular permeability – urticaria, hypotension, anaphylaxis***
- ***Smooth muscle spasm – asthma, intestinal cramps, diarrhea, anaphylaxis***
- ***Mucus secretion – allergic rhinitis, asthma***
- ***Nerve stimulation-itch, sneeze***

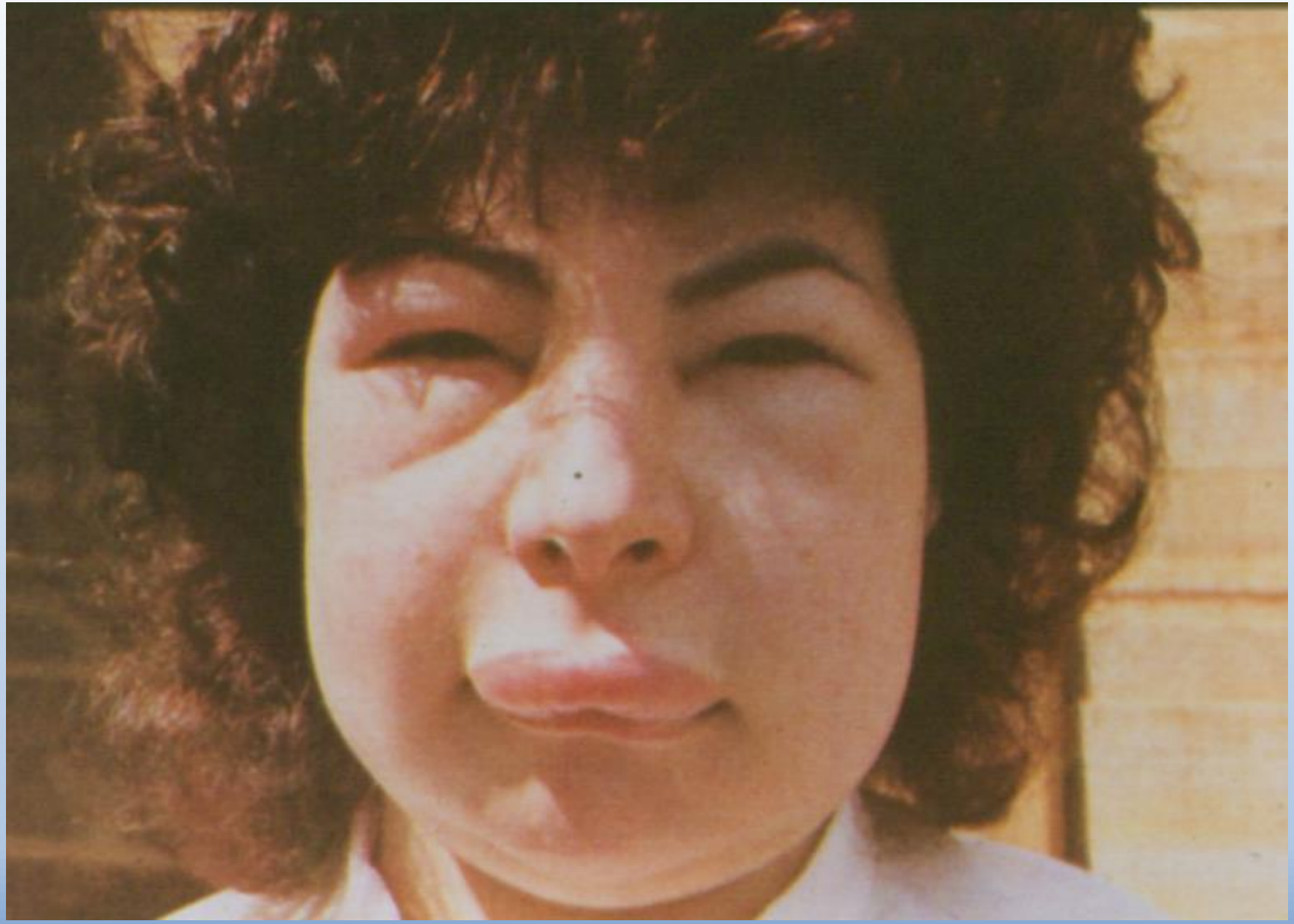
URTICARIA

- ***Raised central white or red wheals***
- ***Surrounding erythema or flare, with itch or burning***
- ***Histamine mediated***
- ***Varies in shape & size – circular, gyrate, linear, isolated or coalescent***
- ***Well demarcated, blanch with pressure***
- ***Predisposition to warm areas, pressure sites***
- ***Lasts hours, max 24 - 48***



ANGIOEDEMA

- **Diffuse skin colored subcutaneous swelling**
- **Pathology similar to urticaria except it occurs in deeper subcutaneous tissues**
- **Not itchy or painful, unless in confined site**
- **Can be histamine, bradykinin etc mediated**
- **Can last hours or days**
- **Not very responsive to antihistamines**
- **Approx 40% of urticaria cases**



ANAPHYLAXIS: OVERVIEW

- **Anaphylaxis is a severe, potentially fatal systemic allergic reaction that occurs suddenly (minutes to hours) after contact with an allergy-causing substance**
- **Death can occur in minutes, usually due to closure of airways**
- **Allergic reaction affects many body systems : rash & swelling, breathing difficulties, vomiting & diarrhoea, heart failure & low blood pressure → ANAPHYLACTIC SHOCK**

Girl, 14, dies after sampling sauce

Undetected allergy to peanuts fatal

By Tony Lofaro
Citizen staff writer

Christiane Guay enjoyed most foods, though like many teenagers she balked at eating broccoli or brussels sprouts. But the thing she hated most was the smell and taste of peanuts, and purposely avoided them.

The 14-year-old student at Lester B. Pearson High School in Gloucester had no inkling a normal meal made with peanut sauce, prepared by her mother, Jacinthe, would prove to be deadly.

At the family dinner table Wednesday night, Christiane sat with her mother, her sister, Marie-Lyne, 17, and brother, Matthieu, 16, and sampled a mere teaspoon of a peanut sauce dish.

It was enough to bring on an immediate violent reaction. Her throat swelled and blocked her breathing before she passed out on the kitchen floor of her Ogilvie Road home.

She was rushed to the Children's Hospital of Eastern Ontario and was placed on a life-support system. She died a few days later after her heart stopped. Christiane, an asthma sufferer, had an anaphylactic reaction to the peanut sauce, CHEO doctors told the family.

On average, three children per year in Ontario die from an allergic reaction to food, although there could be more because many deaths are probably not reported that way, says a local pediatric allergist. The most serious kinds of allergic reactions affect about 150,000 Canadians.

After Christiane's death, her family acted quickly and donated her heart, lungs and kidneys to two patients in London, Ont.

The girl's father, Jacques Guay, was working in Thunder Bay when the accident happened.

GIRL continued on page A2

Christiane Guay disliked peanuts and avoided them, but her family never had any reason to believe she had an allergy

Peanut, other allergies can surface at any time

Citizen staff

Peanut and other allergies can suddenly become life-threatening long after infancy, an Ottawa pediatric allergist says.

The fact that a person did not have a serious reaction in the past does not rule out a life-threatening reaction later, Dr. Antony Ham Pong warned on Monday. And, in a fact sheet he has prepared for parents, Ham Pong says that in cases where mild allergic reactions have occurred in the past, severe reactions can occur later with the same amount of food.

Ham Pong said that in recent years, he has been seeing more cases of children developing a reaction to peanuts.

The influx of patients at his Russell Road practice is largely due to a greater public awareness of the dangers of peanut allergies, he said.

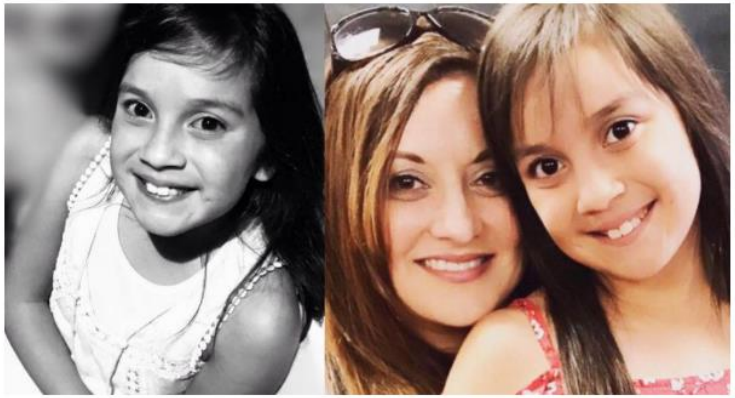
While the bulk of his patients are children under ten, the biggest increase is among children under three years of age.

PEANUT continued on page A2

Life

Mom's heartbreaking warning after 11-year-old daughter dies from allergic reaction to toothpaste

Elizabeth Di Filippo
Yahoo Canada Style April 17, 2019



Denise Saldate and her mother, Monique Altamirano. Image via Facebook.

The mother of an 11-year-old girl who died after an allergic reaction to toothpaste is sharing her story.

The family of Denise Saldate is in mourning after her sudden death caused by a reaction to a milk protein in prescription toothpaste.

The West Covina, Calif. girl died on April 6, just two days after she received a prescription for MI Paste One brand of medicated toothpaste to help strengthen her tooth enamel.

ALSO SEE: ***Mum urges parents to vaccinate their children, shares photos of her newborn with measles***

Univ. of Maryland puts EpiPens in campus dining halls

This Oct. 10, 2013, file photo, shows an EpiPen epinephrine auto-injector, a Mylan product, in Hendersonville, Texas. (AP Photo/Mark Zaleski, File)

13 WTHR.COM STAFF

PUBLISHED: APR 22ND, 2019 - 5:34AM (EDT) UPDATED: APR 23RD, 2019 - 3:39AM (EDT)

COLLEGE PARK, Md. (WTHR) — With food allergies on the rise in America, the University of

Anaphylaxis:

Rapid recognition and treatment

Fatal anaphylaxis

	Minutes to cardiac arrest	
	Median	Range
55 iatrogenic	5	1 – 80
37 food	30	6 – 360
32 venom	15	4 – 120

Pumphrey RSH, Clinical and experimental allergy, 2000

Anaphylaxis:

Rapid recognition and treatment

recognition

- Underrecognized, undertreated
- Most important diagnosis marker is **trigger**
- Over 40 symptoms and signs described

cutaneuos	>80%
respiratory	up to 70%
gastrointestinal	up to 40%
cardiovascular	up to 35%

CLINICAL MANIFESTATIONS OF ANAPHYLAXIS

- **SKIN- urticaria, angioedema, pruritus, erythema**
- **RESPIRATORY- rhinitis, conjunctivitis, cough, dyspnea, wheeze, stridor, voice change**
- **GI – throat swelling or tightness, dysphagia, vomiting, diarrhea, cramps**
- **CVS – hypotension, dizziness, syncope, cyanosis, secondary myocardial infarction**
- **CNS –hypoxic seizures**

Anaphylaxis: clinical features

• Skin	85%
• Upper respiratory	56%
• Lower respiratory	47%
• Cardiovascular	33%
(30%of adults, 5% of children)	
• Gastrointestinal	30%
• Rhinitis	16%
• BIPHASIC ANAPHYLAXIS	5 - 8%

Anaphylaxis: Causes of Death

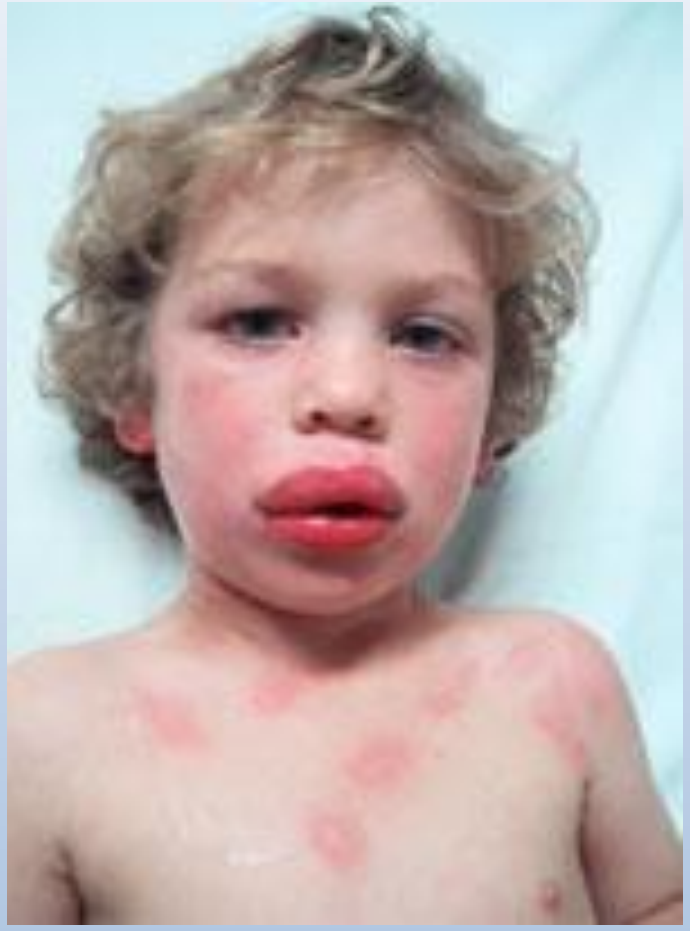
- *Upper and/or Lower Airway Obstruction (70%)*
- *Cardiac Dysfunction (24%)*

BIPHASIC ANAPHYLAXIS

What is the importance?

BIPHASIC ANAPHYLAXIS

- Early signs may be deceptively mild, resolves with or without treatment; the biphasic phase then occurs and may lead to fatal outcome
- Delayed epinephrine treatment or inadequate dose are risk factors
- Severe initial phase may predispose to biphasic
- Important to monitor in ER for 4-6 hrs after an anaphylactic reaction
- Steroids may not prevent it, but often used



Potentional pitfalls in recognition of anaphylaxis

- **Absent / missed skin symptoms**
- **Non-specific signs of hypotension (confusion, collapse, incontinence...)**
- **Certain conditions (surgery)**
- **DDx – asthma exacerbation**

– Lab tets to support Diagnosis (tryptase)

Causes of Anaphylaxis

- **Food allergy**
- **Medication allergy**
- **Insect (hymenoptera) sting allergy**
- **Physical eg exercise, cold,**
- **Latex allergy**
- **Allergy to vaccines, hormones, seminal fluid**
- **Allergic reactions to immunotherapy, skin tests**
- **Idiopathic**

Anaphylaxis:
Rapid recognition and treatment

GENERAL MANAGEMENT OF ANAPHYLAXIS

- **Airway**
- **Breathing**
- **Circulation**

- **But use epinephrine promptly**

Fatal anaphylaxis: risk factors

- Concomitant asthma
- No epinephrine
- Non effective epinephrine
- Other cardiopulmonary disease

Initial AnaphylaxisTreatment

- **Epinephrine (adrenaline) is first line treatment**
- **Epinephrine IM**
- **Antihistamines & bronchodilators are not first line treatment but may be given after epinephrine.**
- **Once epi is given then throw everything else you have at them . . . .**

Management of anaphylaxis: Initial

- **Epinephrine 0.01mg/kg (max 0.5mg) IM X3, every 5-20min as needed. In severe cases epinephrine IV**
- **H1 antagonists Diphenhydramine (Benadryl) 25-100mg**
- **H2 antagonists eg ranitidine**
- **IV fluids, O2 etc if in hospital**
- **Corticosteroids**

Management of anaphylaxis: Bronchospasm

- **SVN albuterol**
- **Oxygen**
- **Intubation and ventilation if needed**

Management of anaphylaxis: Hypotension

- **Trendelenberg position**
- **Volume expansion with crystalloid**
- **Vasopressors eg dopamine, norepinephrine, metaraminol, vasopressin**
- **Glucagon esp if on beta-blocker**

Treatment of Anaphylaxis in Beta Blocked Patients

- **Give epinephrine initially.**
- **If patient does not respond to epinephrine and other usual therapy:**
- **Glucagon 1 mg IV over 2 minutes**

EFFECTS OF EPINEPHRINE

- **Increases BP, reverses peripheral vasodilation , (alpha-adrenergic activity)**
- **Reduces urticaria and angioedema by vasoconstriction (alpha)**
- **Bronchodilation – relaxes bronchial smooth muscle (beta-2 adrenergic activity)**
- **Increases cardiac contractility – force and volume, increasing heart rate & BP (beta-1)**
- **Prevents further mast cell degranulation (beta)**

SIDE EFFECTS OF EPINEPHRINE

- Based on the effects of epinephrine, what would you predict as the possible side effects?
- What conditions or factors would you consider as higher risk for side effects of epinephrine use?

If you (heaven forbid) should give epi when you didn't need to. . What bad stuff happens to the patient???

REVIEWS

Who needs to carry an epinephrine autoinjector?

Cleveland Clinic Journal of Medicine. 2019 January;86(1):66-72

Author(s): T. Ted Song, DO, FAAAI, FACP; Phil Lieberman, MD

Author and Disclosure Information

ABSTRACT

Patients who have had anaphylaxis or who are at risk of it (eg, due to food allergy or *Hymenoptera* hypersensitivity) should carry an epinephrine autoinjector at all times. However, the risks and benefits must be considered on an individual basis, especially in patients with atherosclerotic heart disease, elderly patients on polypharmacy, patients receiving allergen immunotherapy, those with large local reactions to insect stings, and individuals with oral allergy syndrome.

PDF DOWNLOAD

KEY POINTS

- Based on current data, there is no absolute contraindication to epinephrine for anaphylaxis. And failure to give epinephrine promptly has resulted in deaths.
- Clinicians concerned about adverse effects of epinephrine may be reluctant to give it during anaphylaxis.
- Education about anaphylaxis and its prompt treatment with epinephrine is critical for patients and their caregivers.

Epinephrine Auto-Injectors

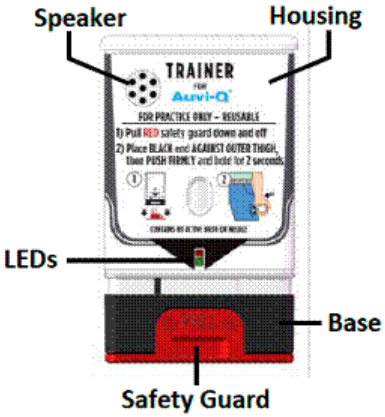
- Epinephrine Auto-injectors are easy to use
- Come with instructions
  - Trainers available for practice use
- Websites have video demonstrations – know how to administer your auto-injector!

Epi-Pen® video	http://www.epipen.com/how-to-use-epipen Epipen4schools.com
Auvi-Q® video	https://www.auvi-q.com/
Adrenaclick®	http://www.adrenaclick.com/about-adrenaclick/adrenaclick-training.aspx
Generic	http://www.epinephrineautoinject.com/

TRAINER for AUVI-Q

Outer Case

Device

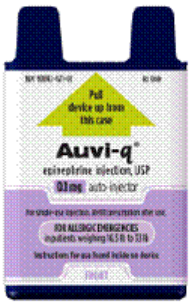


Top view

AUVI-Q

AUVI-Q 0.3 mg is **orange**

AUVI-Q 0.15 mg is **blue**



AUVI-Q 0.1 mg is **white and lavender**

The Journal of Allergy and Clinical Immunology: In Practice

< Previous Article | May–June, 2013 Volume 1, Issue 3, Pages 266–272.e3 | Next Article >

Auvi-Q Versus EpiPen: Preferences of Adults, Caregivers, and Children

Carlos A. Camargo Jr., MD, DrPH, FAAAAI[a,*], Adriana Guana, MD[b], Sheldon Wang, PhD[b], F. Estelle R. Simons, MD, FRCPC, FAAAAI[c]

DOI: https://doi.org/10.1016/j.jaip.2013.02.004

Article Info

Abstract | Full Text | Images | References | Supplemental Materials

Article Outline

Background

Auvi-Q is a novel epinephrine autoinjector (EAI) that provides audio and visual cues for patients at risk for life-threatening allergic reactions.

Objective

We tested the preference for Auvi-Q or EpiPen with regard to method of instruction, preference to carry, device

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Advertisement

Epinephrine (Epipen)

Generic Epipen, Epipen JR

Epinephrine (EpiPen, EpiPen Jr) is an expensive drug used for the emergency treatment of severe allergic reactions. You should keep this medicine with you at all times. This drug is slightly more popular than comparable drugs. It is available in brand and generic versions. Alternate brands include Adrenaclick. Generic epinephrine is covered by most Medicare and insurance plans, but pharmacy coupons or cash prices may be lower. The lowest GoodRx price for the most common version of epinephrine (Epipen) is around $118.07, 69% off the average retail price of $388.14. Compare catecholamines.

Prescription Settings | epinephrine (Epipen) (generic) | package | 2 auto-injectors of 0.3mg | 1 package | SHARE

Savings Alert: Generic Adrenaclick, another epinephrine pen, sells for as low as $9.95 with a manufacturer coupon. **Learn More**

Prices and coupons for 1 package (2 auto-injectors) of epinephrine (Epipen) 0.3mg

- Prices
- Medicare
- Drug Info
- Side Effects
- Images

Set your location for drug prices near you

Walmart	$373 est retail price	$118.07 with free discount	GET FREE DISCOUNT
Rite Aid	$413 est retail price	$121.50 with free coupon	GET FREE COUPON
Walgreens	$376 est retail price	$126.13 with free coupon	GET FREE COUPON
Target (CVS)	$340	$134.27	

Put GoodRx in your

GoodRx | Type your drug name (like Atorvastatin, Sildenafil, etc) | How GoodRx Works | Discount Card | More | Help | Sign In

Auvi-Q

EPINEPHRINE is used for the emergency treatment of severe allergic reactions. You should keep this medicine with you at all times. The lowest GoodRx price for the most common version of Auvi-Q is around $4,859.40, 20% off the average retail price of $6,105.81. Compare catecholamines.

Prescription Settings | brand | package | 2 auto-injectors of 0.3mg | 1 package | SHARE

- Prices
- Medicare
- Drug Info
- Side Effects
- Images

Prices and coupons for 1 package (2 auto-injectors) of Auvi-Q 0.3mg

Set your location for drug prices near you

Costco	$4,859.40 with free coupon	GET FREE COUPON
Albertsons	$5,007.50 with free coupon	GET FREE COUPON
Safeway	$5,007.50 with free coupon	GET FREE COUPON
Smith's	$5,021.05 with free coupon	GET FREE COUPON

Epinephrine (Adrenaclick)

Generic Adrenaclick

Epinephrine (Adrenaclick) is an expensive drug used for the emergency treatment of severe allergic reactions. You should keep this medicine with you at all times. This drug is slightly less popular than comparable drugs. It is available in brand and generic versions. Alternate brands include EpiPen and EpiPen Jr. Generic epinephrine is covered by most Medicare and insurance plans, but pharmacy coupons or cash prices may be lower. The lowest GoodRx price for the most common version of epinephrine (Adrenaclick) is around $109.99, 58% off the average retail price of $267.77.

Prescription Settings | generic | package | 2 auto-injectors of 0.3mg | 1 package | SHARE

- Prices
- Medicare
- Drug Info
- Side Effects
- Images

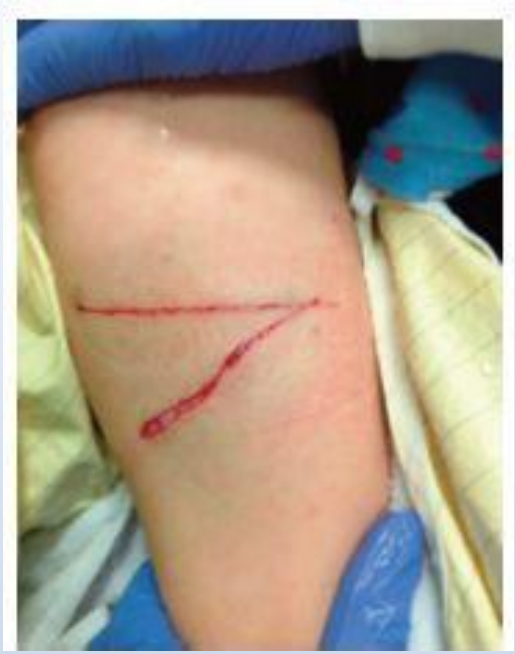
Prices and coupons for 1 package (2 auto-injectors) of epinephrine (Adrenaclick) 0.3mg

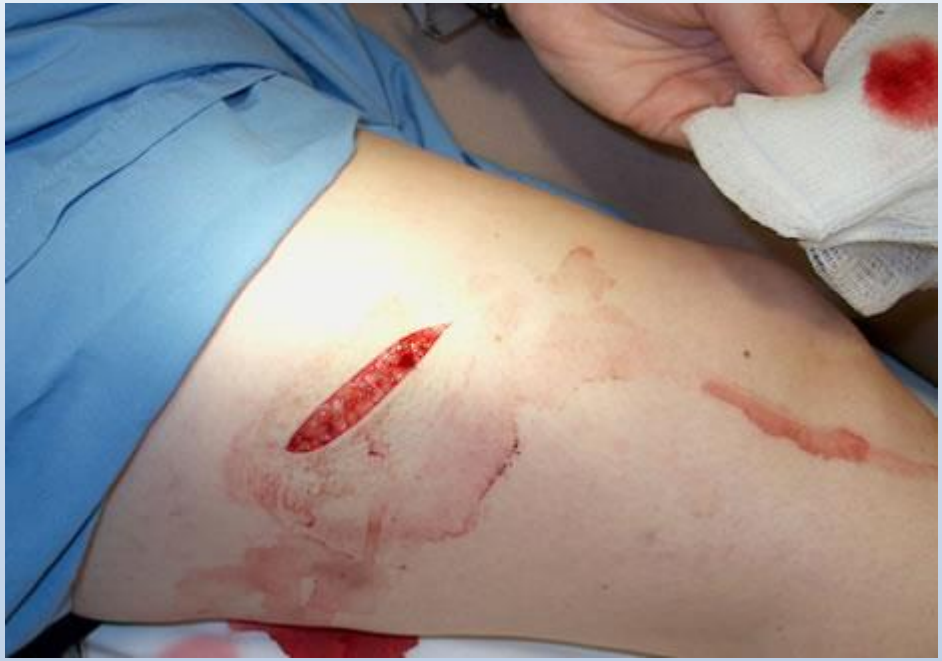
Set your location for drug prices near you

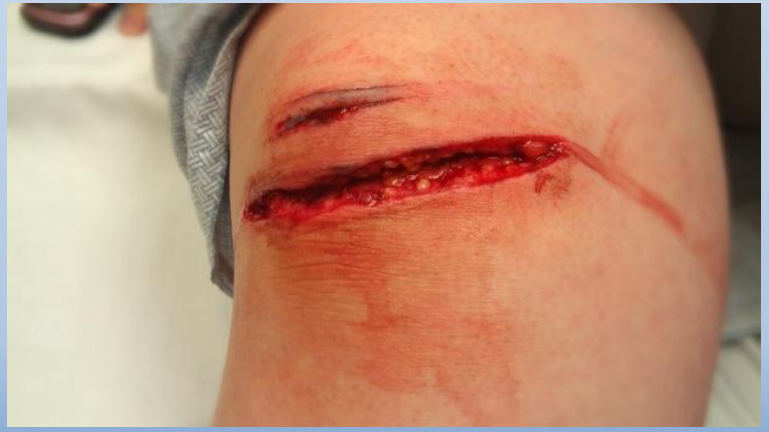
Target (CVS)		$109.99 retail price	LEARN MORE
Costco		$142.48 with free coupon	GET FREE COUPON
Walgreens		$146.99 retail price	LEARN MORE
Walmart	$430 est retail price	$202.49 with free discount	GET FREE DISCOUNT

Product	Strengths Available	Price Estimate (2-pack)	Ways to Save
EpiPen; EpiPen Jr. (epinephrine auto-injector)	0.15 mg; 0.3 mg	About $650-$700 cash price (two auto-injectors).	Possibly save $300 on EpiPen or EpiPen Jr from Mylan.
Authorized Generic for EpiPen and EpiPen Jr. (epinephrine auto-injector) from Mylan	0.15 mg; 0.3 mg	About $150 to $300; possibly higher priced at other pharmacies; call ahead.	Coupon may be needed.
epinephrine (generic for EpiPen, EpiPen Jr.) from Teva	0.15 mg; 0.3 mg	Price not yet available.	Expected to be low cost but coupon may still be beneficial.
Adrenaclick	0.15 mg; 0.3 mg	Roughly $450 to $500; price varies among pharmacies.	Drugs.com Discount Card
Authorized Generic for Adrenaclick (epinephrine auto-injector) from Impax	0.15 mg; 0.3 mg	$109.99 at CVS Pharmacy; higher at other pharmacies.	No coupon needed; possibly save $50 from Impax at epinephrineautoinject.com
Auvi-Q	0.1 mg (coming in 2018), 0.15 mg; 0.3 mg	$0 copay for insured patients and for families with income of less than $100,000/year without insurance. One prescription includes two auto-injectors. Has voice instructions.	AUVI-Q AffordAbility Patient Assistance
Symjepi	0.3 mg	Price not yet available; launch date unknown. One prescription includes two syringes.	See manufacturer's website for patient assistance.

Autoinjector Lacerations







The TEN study: time epinephrine needs to reach muscle

Troy W. Baker, DO*,*, Christopher M. Webber, MD*, Adrienne Stolfi, MSPH†, Erika Gonzalez-Reyes, MD*

DOI: https://doi.org/10.1016/j.anai.2011.06.001

Article Info

Abstract | Full Text | Images | References

Background

An epinephrine autoinjector (EAI) is designed to deliver epinephrine into the vastus lateralis muscle. Several studies have demonstrated both patient and physician difficulties in correctly using EAIs, specifically premature removal of the device from the thigh.

Objective

To evaluate the correlation between duration of injection with an EAI and amount of epinephrine absorbed into muscle tissue.

Methods

Twenty-one EAI devices (0.3 mL) were used to determine the amount of epinephrine injected into marbleized beef during 7 time periods. A digital scale was used to record preinjection and postinjection weights of EAIs and beef. The weight difference between the preinjection and postinjection periods of the EAIs was used to calculate the total amount of epinephrine released and available for absorption into the marbleized beef. The difference between the preinjection and postinjection beef weight was used to determine the amount of epinephrine absorbed into the meat.

Results

The correlation with duration of injection for both the amount of epinephrine absorbed and released was 0.321 (P = .48). At all intervals, 95.9% or more of epinephrine was absorbed into the marbleized beef. The correlation with duration of injection and percent of epinephrine absorbed was 0.464 (P = .29). There were no time periods that were significantly different from the percentage of epinephrine absorbed by the marbleized beef at 10 seconds (analysis of variance P = .16).

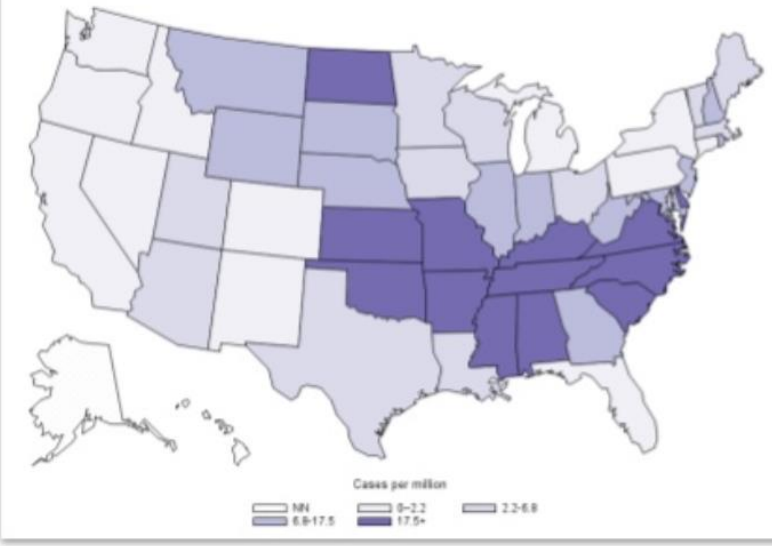
Conclusion

No linear relationship between time and amount of epinephrine injected or absorbed into muscle tissue was demonstrated. These data suggest that holding the device in place for 1 second is as effective as 10 seconds.

Alpha Gal – the story of the tick that keeps on biting!

Incidence of Rocky Mountain spotted fever

Epidemiology Figure 4 – Annual incidence (per million persons) for SFR in the United States, 2017

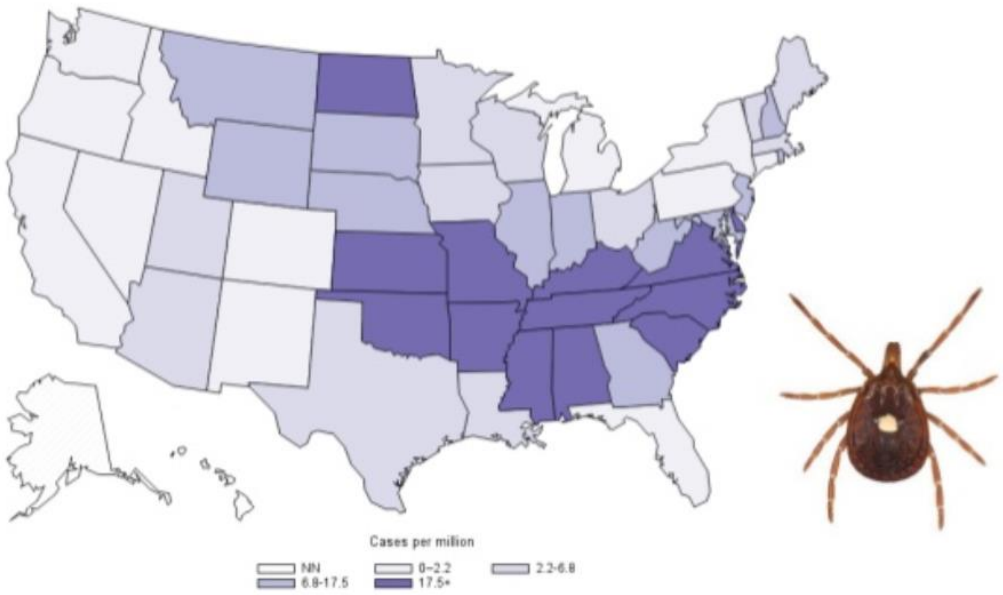


Distribution of Lone Star Tick

Tripathi A. et al. J Allergy Clin Immunol Pract 2014;2:259-65
https://www.cdc.gov/rmsf/stats/index.html

Alpha-gal & Lone Star Tick (*Amblyomma americanum*)

Epidemiology Figure 4 – Annual incidence (per million persons) for SFR in the United States, 2017



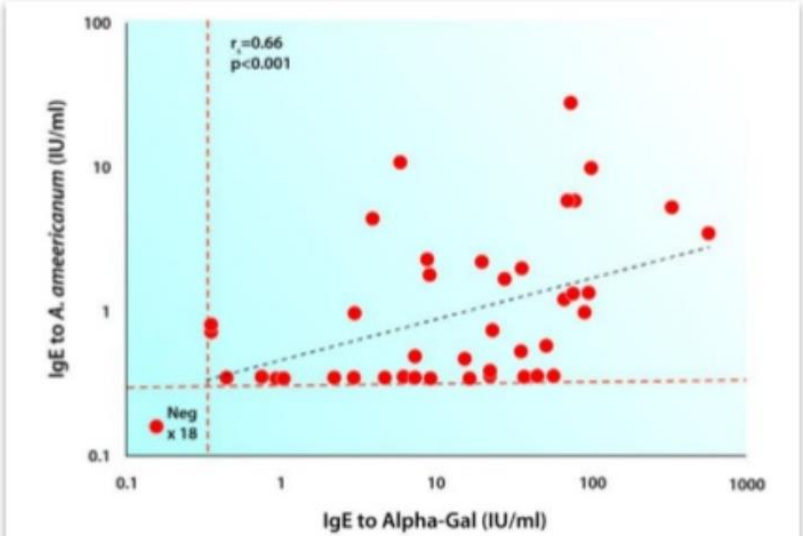
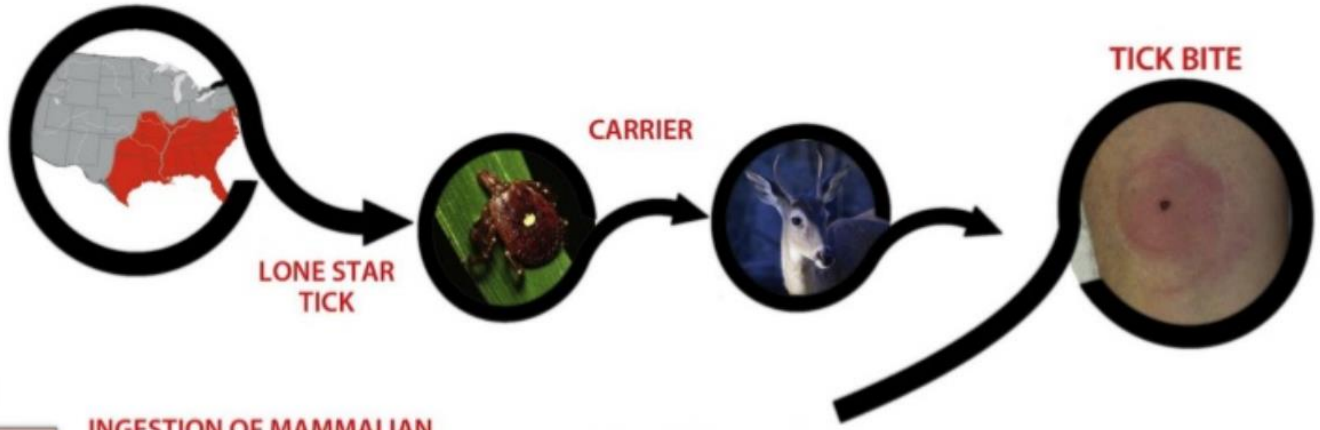


FIG 2. Relationship of IgE to alpha-gal with IgE to *Amblyomma americanum* (lone star tick). Levels of specific IgE to alpha-gal and *A americanum* were measured by using ImmunoCAP, and the correlation between the 2 types of IgE was determined by using Spearman correlation (r_s = 0.66, P < .001).

https://www.cdc.gov/rmsf/stats/index.html

Commins S, et.al, J Allergy Clin Immunol. 2011 May ; 127(5): 1286–1293.e6.

Summary of alpha-gal sensitization leading to clinical symptoms of red meat allergy



INFUSION OF CETUXIMAB

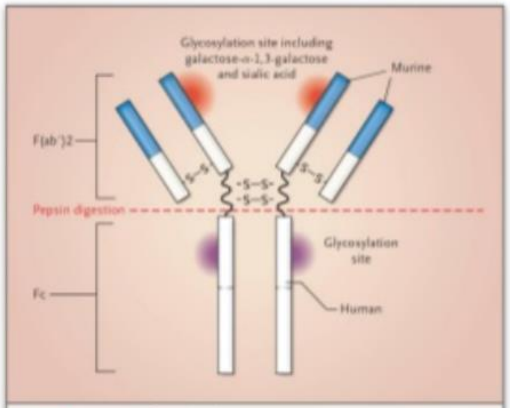
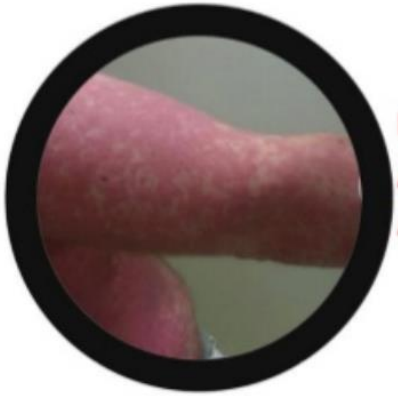


Figure 2. **Structure of Cetuximab.**
The amino acid sequence of cetuximab has potential glycosylation sites at Asn43 of the light chain and at Asn88 and Asn299 of the heavy chain. The sugars on the Fab portion include galactose-α-1,3-galactose and the sialic acid *N*-glycolylneuraminic acid. In contrast, the glycosylation site at Asn43 is not glycosylated, and glycosylation of the Fc portion of the heavy chain includes only oligosaccharides that are commonly present on human proteins.[17,18] S–S denotes a disulfide bond.

INGESTION OF MAMMALIAN PRODUCTS

IgE to alpha-gal (1-3 months)

2-6 hours

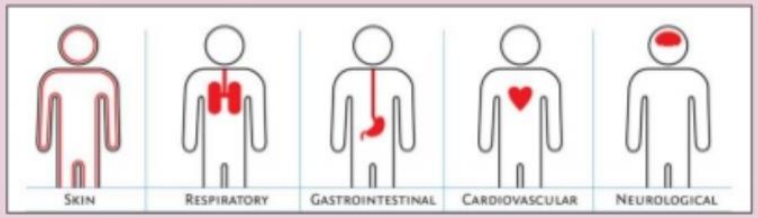


Urticaria
Angioedema
Anaphylaxis

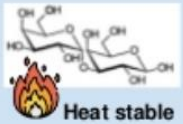
J Allergy Clin Immunol 2015;135:589-96.

Red meat allergy

Symptoms: typical IgE-mediated reaction



Allergen: galactose-alpha-1,3-galactose



Found in most mammal meats

Except: Old-world monkeys, Apes, Humans

Some patients also allergic to: milk, gelatine, and visceras

DELAYED onset: 2-10 hr (mostly 3-6 hr)

May be in the middle of the night

Hard to realize "food allergy"

Factor:

Typical onset of IgE mediated food allergy: within 2 hr

ingestion

Etiology: certain tick-bite

JAMA. 2018;319(4):332.
Asia Pac Allergy. 2015 Jan;5(1):3-16
https://foodallergycanada.ca/2016/07/know-signs-symptoms-anaphylaxis/

What's new: Food introduction

- New data (LEAP study) suggests early introduction in high risk infants may reduce risk of allergy by 80%+
- For low risk infants, introduce peanut protein between 4-6 months of age
- Moderate risk (moderate eczema) introduce 4-6 months or allergy referral
- High risk infants – egg allergy, severe eczema or both – 4-6 months AFTER allergy referral

What's new: Peanut desensitization

- Take those with CONFIRMED anaphylaxis to peanut and start them on a tiny dose of peanut protein
- Slowly raise the level to a maximum of approx. 2 peanut kernels (600mg) of peanut protein
- 80% or so can get to this point – take away accidental exposure – which is most causes of anaphylaxis.

5 EASY WAYS TO INTRODUCE PEANUT FOODS TO YOUR INFANT

preventpeanutallergies.org

1 MIX WITH WATER, FORMULA OR BREAST MILK

Thin 2 tsp. of peanut butter with 2-3 tsp. hot water, formula or breast milk. Allow to cool before serving.

2 MIX WITH FOOD

Blend 2 tsp. of peanut butter into 2-3 Tbsp. of foods like infant cereal, yogurt (if already tolerating dairy), pureed chicken or tofu.

3 MIX WITH PRODUCE

Stir 2 tsp. of powdered peanut butter into 2 Tbsp. of previously tolerated pureed fruits or vegetables.

4 PEANUT SNACKS

Give your baby a peanut-containing teething food, such as peanut puffs.

5 TEETHING BISCUITS

Teething infants who are older and self-feeding may enjoy homemade peanut butter teething biscuits. Find a recipe for teething biscuits at **nationalpeanutboard.org**

Remember:

The recommended way to introduce baby-friendly peanut foods depends on each child's individual risk factors. Depending on your child's risk, peanut foods should be introduced according to NIAID guidelines after they've already started other solid foods. Whole nuts should not be given to children under 5 years of age. Peanut butter directly from a spoon or in lumps/dollops should not be given to children less than 4 years of age. This content is not intended to be a substitute for professional medical advice, diagnosis or treatment. Always seek the advice of your pediatrician.

10 FAACTs *about* Food Allergies

1. Food allergies affect **15-32 million** Americans, including 6 million children. Studies report that **1 in 13** children and up to **1 in 10** adults in the United States have a food allergy. For children, this averages to **two** children per classroom.
2. A food allergy is an **immune system response** to a food that the body mistakenly believes is harmful.
3. Eight foods account for 90% of all food allergy reactions: **Peanuts, Tree nuts, Milk, Egg, Wheat, Soy, Fish, & Shellfish**. However, almost any food can cause a reaction.
4. There is **no cure** for food allergies and **strict avoidance** is the only way to prevent an allergic reaction.
5. **Trace amounts** of an allergen can trigger an allergic reaction in some individuals. Past reactions to a food allergy **do not predict future reactions**! Someone can still have a life-threatening reaction to a food they are allergic to, even if they have never had a serious reaction before.
6. Symptoms can **develop rapidly** after exposure to an allergen, often within minutes and usually within 30 minutes. However, it can take up to 2 hours for symptoms to occur after exposure to a food allergen.
7. Anaphylaxis is a **serious allergic reaction** that comes on quickly and has the potential to become life-threatening. Anaphylaxis requires immediate medical treatment, including an injection of epinephrine and a visit to the emergency room.
8. It is important to be deliberate and not hesitate when you have to use epinephrine. The device is **potentially life-saving**. A call to 9-1-1 and a trip to the emergency room should always follow epinephrine administration.
9. Individuals at risk should carry **two epinephrine auto-injectable devices** with them at all times AND an **Allergy and Anaphylaxis Emergency Care Action Plan** signed by a board-certified allergist.
10. **Food allergies continue to rise** and are a safety and public health concern across the United States. You can get free resources and find out how to help keep those with food allergies safe at:

www.FoodAllergyAwareness.org

FAACT
Food Allergy & Anaphylaxis Connection Team
AWARENESS • ADVOCACY • EDUCATION
www.FoodAllergyAwareness.org

SafeFARE: Chef Card Template

How to use your chef card: In addition to asking a lot of questions about the ingredients and preparation methods, carry a "chef card" that outlines the foods you must avoid. Present the card to the chef or manager for review.

Fold your card in half, then tape it together and store in your wallet. You can even laminate it to make it more durable. Be sure to make several copies in case you forget to retrieve it from the restaurant or to store in multiple locations.

This is an interactive PDF that will allow you to type your allergens directly onto the chef card.

FOLD HERE

Food Allergy Alert

I have severe food allergies. In order for me to avoid a **life-threatening** reaction, I **must avoid** all foods that contain:

Food Allergy Alert

Please make sure that my food does not contain any of the ingredients on the front of this card, and that any utensils and equipment used to prepare my meal, as well as prep surfaces, are fully cleaned immediately before using. **THANK YOU for your help.**

FOLD HERE

Food Allergy Alert

I have severe food allergies. In order for me to avoid a **life-threatening** reaction, I **must avoid** all foods that contain:

Food Allergy Alert

Please make sure that my food does not contain any of the ingredients on the front of this card, and that any utensils and equipment used to prepare my meal, as well as prep surfaces, are fully cleaned immediately before using. **THANK YOU for your help.**

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Thank you!!

Brian Bizik

brianbizik@yahoo.com

208-404-5338