Saint Barnabas Medical Center | RWJBarnabas HEALTH

DRUG ALLERGIES & CROSS-SENSITIVITIES

A Presentation for HealthTrust Members

June 2, 2020

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Speaker & Preceptor Disclosures

- The presenter and his preceptor have no real or perceived conflicts of interest related to this presentation.

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Learning Objectives

- Pharmacists & Nurses:
  - Distinguish the different drug class allergies and their mechanism of action
  - Describe the most common drug allergies and characteristics of an allergic reaction
  - Recommend alternative treatment options based on the drug allergy profile while evaluating the potential risk for the patient

Learning Objectives

- Pharmacy Technicians
  - Identify the characteristics of an allergic reaction and common drug allergies
  - Recognize the names of potentially inappropriate medications based on allergies and cross-sensitivities

Patient Case

- JG is 62 YO female presenting to the ED with pain 9/10. Patient was ordered morphine 4 mg IV push. Pain was relieved, but a rash appeared on her face with some flushing. Patient is not complaining of any other symptoms or shortness of breath.

- Is the patient experiencing a drug allergy?

Adverse Drug Reactions

- A general term utilized to encompass any unwanted reaction to a medication and are broadly divided into Type A and B reactions

Type A	Type B
• Reactions occurring in most patients that are common and predictable • Involves potential overdose, side effects and drug interactions	• Drug hypersensitivity that is relatively uncommon, rare and mostly unpredictable • Involves intolerances, idiosyncrasy, pseudoallergy and drug allergies

Source: Celik G, et al. Middleton's Allergy Principles & Practice. 7th ed. Philadelphia, PA. Mosby Elsevier; 2009

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Type B

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Drug Allergies

- Represents a type of adverse drug reaction
- Encompasses a spectrum of immunologically-mediated hypersensitivities
- Symptoms are rare if *no prior exposure* to the drug is present
  - A reaction after a first dose with no prior exposure is not an allergy

Sources: Gruchalla RS, et al. *N Engl J Med*. 2006;354:601-9
Zhang B, et al. *Pharmacology*. 2018;101(1-2):104-110

Pseudo-Allergic Reactions

- Involves a release of mediators from basophils and mast cells causing an inflammatory response without involvement of antigen-specific immune response
  - Clinically indistinguishable from a true allergic reaction

- Commonly associated agents
  - Opioids, liposomal and micelle-solubilized drugs, and NSAIDs

Sources:
Kowalski ML, et al. *Immunol Allergy Clin N Am*. 2013;33:135-45
Wang H, et al. *Drug Discov Ther*. 2011;*5*(5):211-9

Epidemiology

- Incidence of drug hypersensitivity at 2-4 events per 1000 hospital admissions
- Cutaneous manifestations occur in 75-95% of cases upon clinical presentation in inpatient setting
- Antimicrobials were the most commonly causative drugs with beta-lactams particularly common culprits

Sources: Thong BYH, et al. *Br J Clin Pharmacol*. 2011;71(5):684–700
Blumenthal KG, et al. *Lancet*. 2019; 393: 183-98

Etiology

- Risk factors associated with drug hypersensitivities
  - Young/middle-aged adults > infants/elderly
  - Female gender (2 : 1 female : male ratio)
  - Concomitant infections (HIV, herpes)
  - Concurrent illnesses (systemic lupus erythematosus)
  - Previous reaction to a drug

Sources: Guglielmi L, et al. *Curr Pharm Des*. 2006;12(26):3309-12
Thong BYH, et al. *Br J Clin Pharmacol*. 2011;71(5):684–700

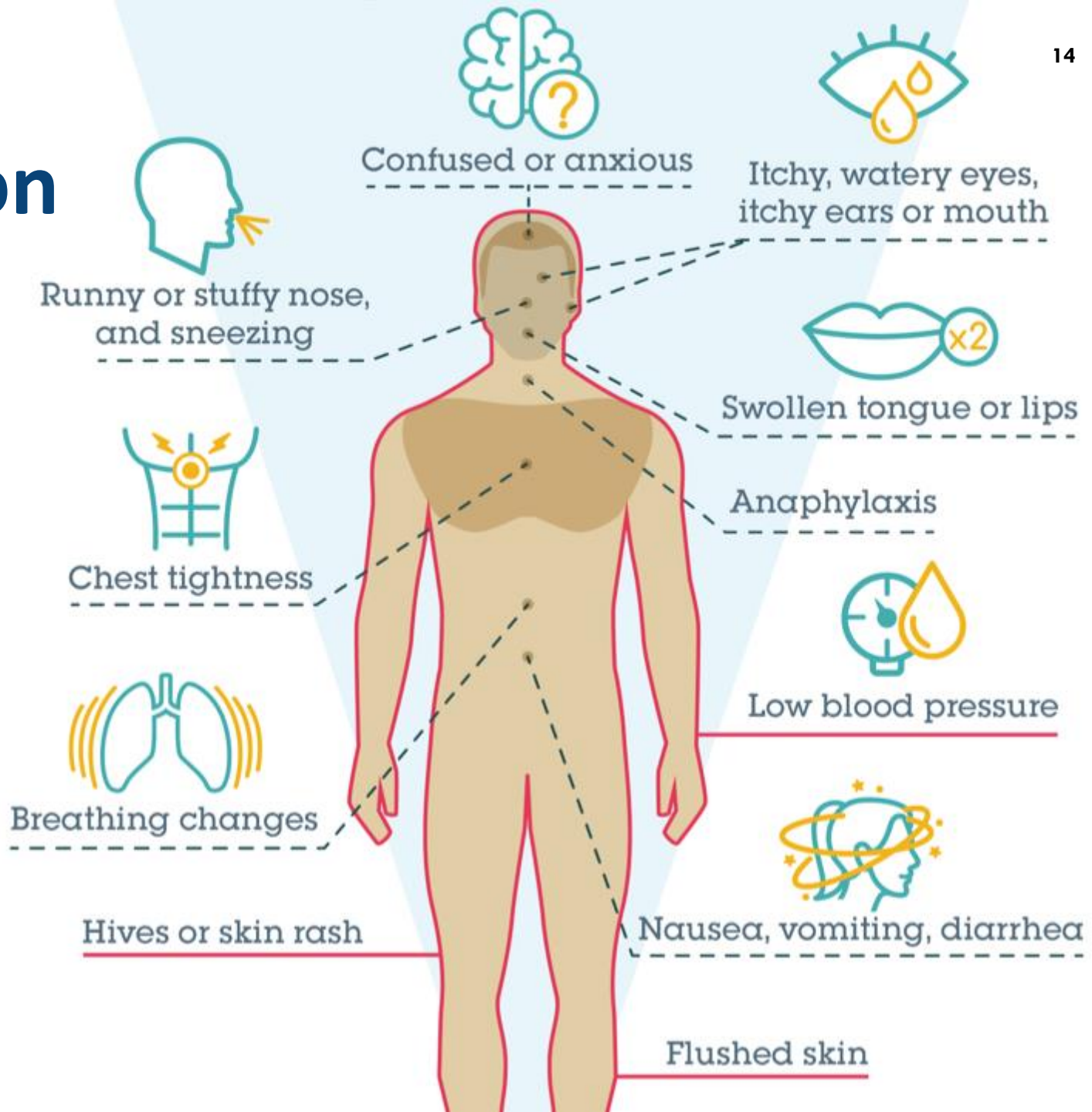
Multiple Drug Allergy Syndrome (MDAS)

- Defined as an adverse reaction to ≥ 2 structurally unrelated drugs with an underlying immune-related mechanism

- Underlying pathogenic mechanisms are unknown, but may represent a broad range of immunopathological responses

Source: Blumenthal KG, et al. *Allergy Asthma Proc.* 2014;35(3):197-203

Clinical Presentation of a Drug Allergy

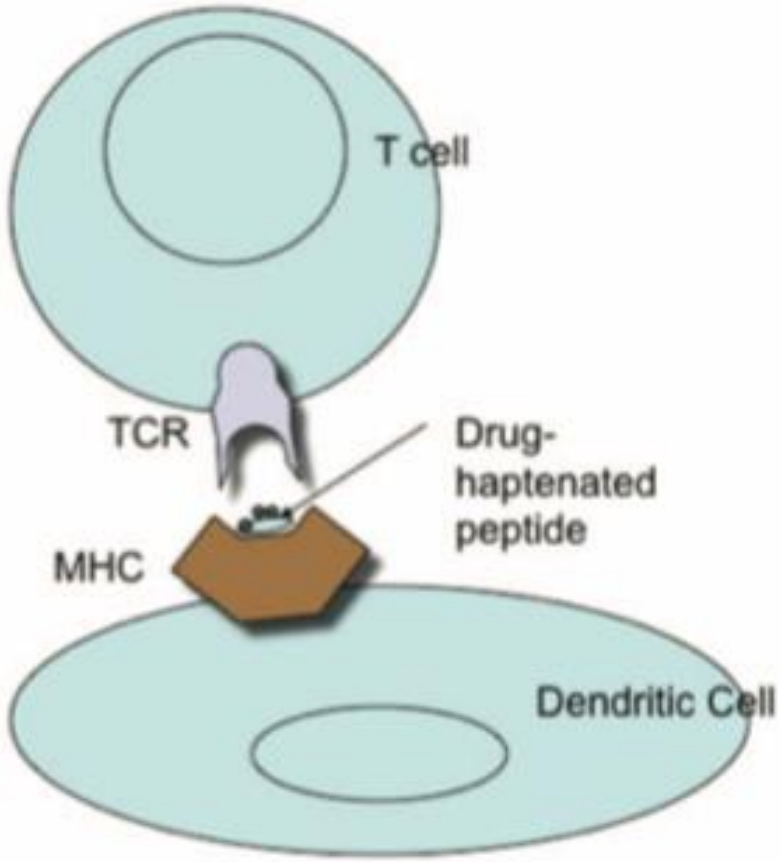


Source:
American College of Allergy, Asthma, and Immunology.
Mayo Clinic. Food Allergy Research & Education.
National Health Service

Pathogenesis

- Characteristics of immunogenic drugs
  - Protein-based agents
  - High molecular weight (> 5,000 Daltons)
  - Route

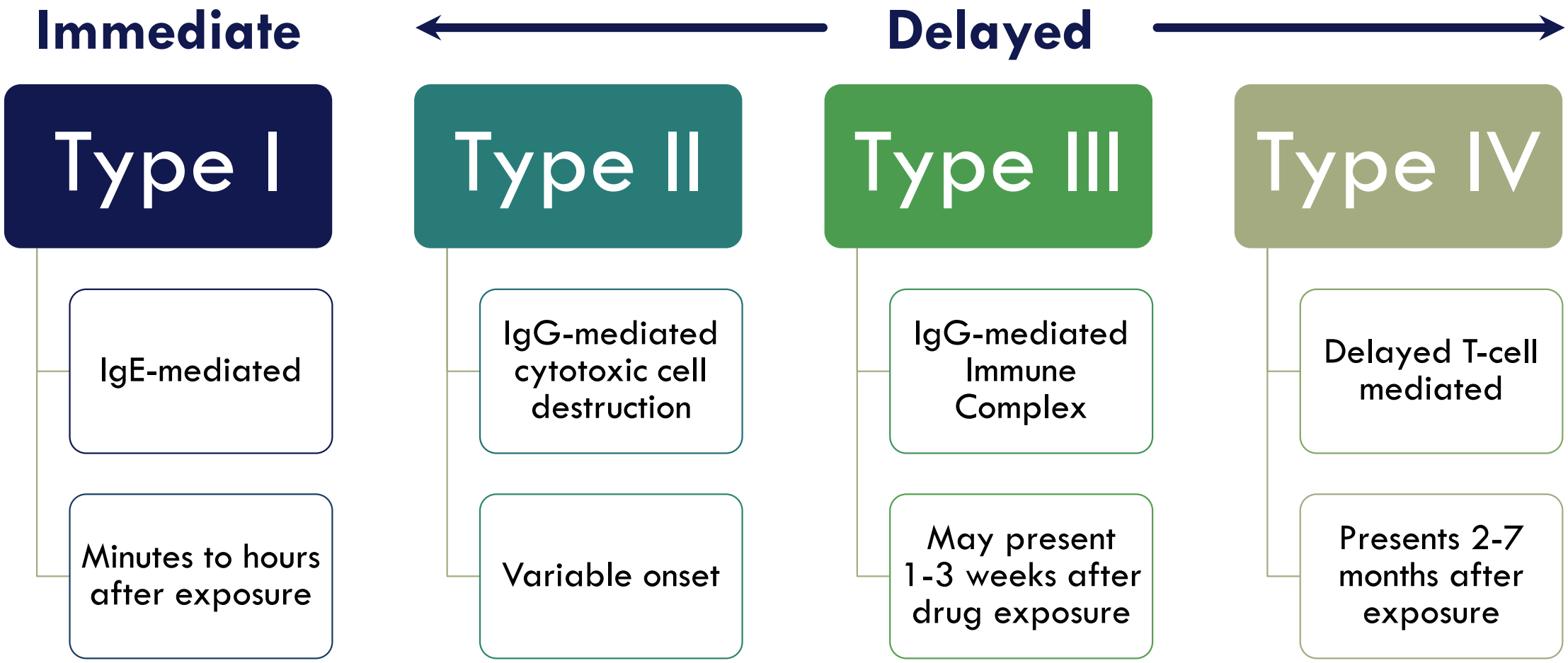
- Drug may elicit an immune response via
  - Direct interaction with immune receptors
  - Acting as an antigen directly or indirectly via a hapten form



MHc presentation of drug-haptenated peptide to the T cell receptor

Sources: Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78
Warrington R, et al. *Hum Vaccin Immunother*. 2012;8(10):1513-1524

Pathogenesis of Drug-Induced Reaction Types



Sources:
Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78
Terico AT, et al. *J Pharm Pract*. 2014;27(6):530-544

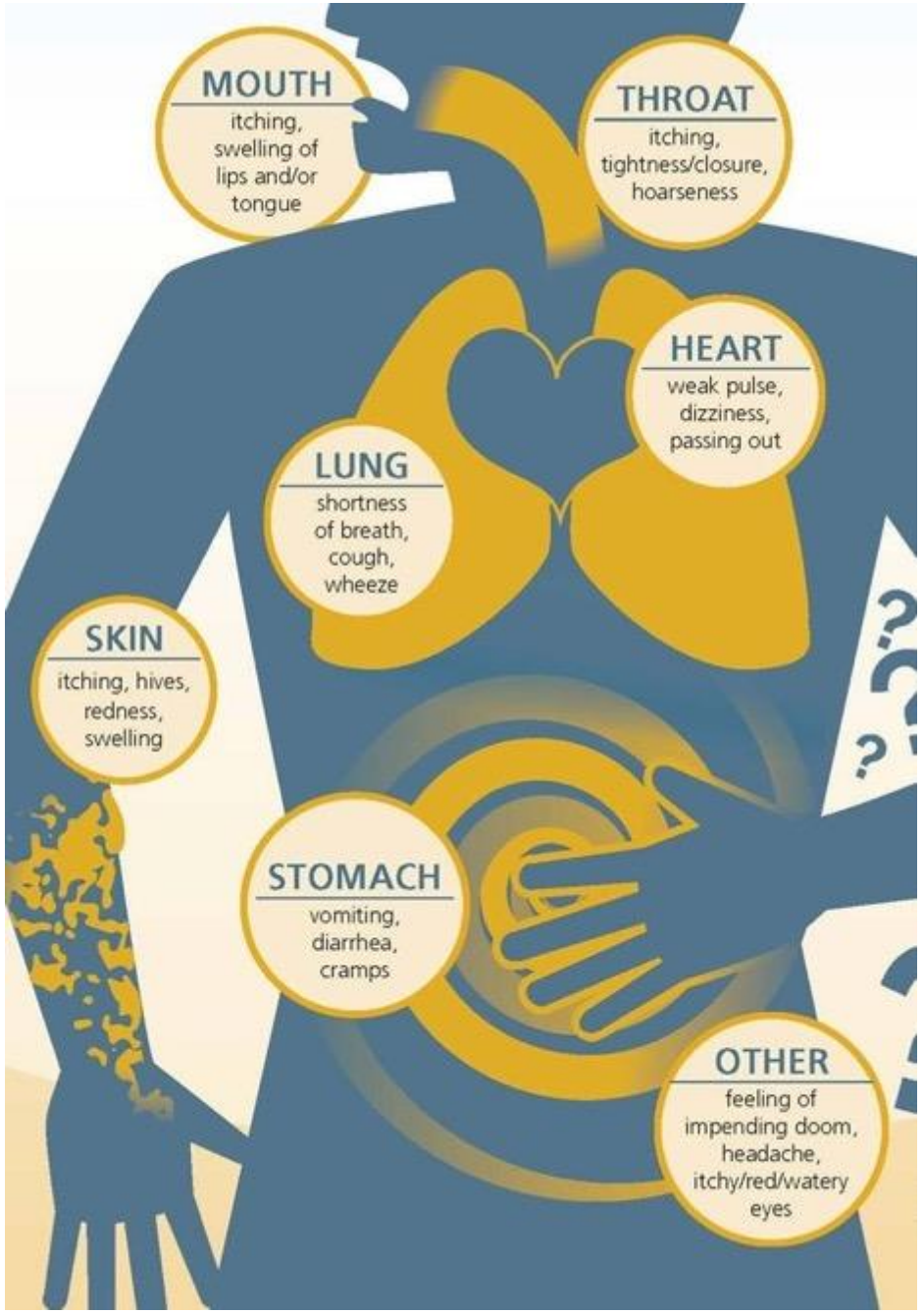
Type I Reaction

- Immunoglobulin E (IgE) mediated
- Involves a drug, its metabolite or cross-reacting agent acting as a ‘hapten’
- Sensitized patients with re-exposure can undergo rapid activation and release of anaphylactic mediators

Sources:
Gruchalla RS, Pirmohamed M. *N Engl J Med.* 2006;354:601-9
Vaillant AA, et al. Treasure Island (FL): StatPearls Publishing; 2020

Type I Reaction

- Vasoactive mediators are involved in the signs and symptoms of reactions
  - Histamine
    - Tachycardia, flushing, bronchospasms
  - Tryptase
    - Produces hypotension, angioedema and clotting
  - Prostaglandins
    - Vasodilation, bronchoconstriction
  - Platelet activating factor
    - Bronchoconstriction



Common symptoms associated with Type I Reaction

Sources:
Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78
Anaphylaxis At a Glance. Allergy & Asthma Network. 2014

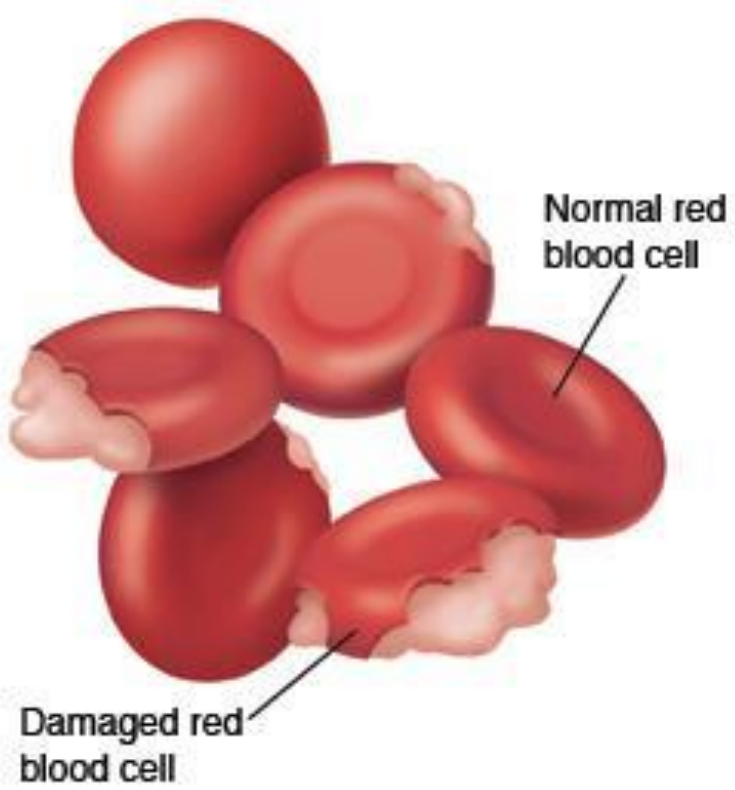
Type I Reaction

- Commonly associated drugs
  - Beta-lactams
  - Neuromuscular blocking agents
  - Quinolones
  - Platinum-containing agents

Source: Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78

Type II Reaction

- IgG- / IgM-mediated reactions
- Involves antibody-mediated cell destruction after the binding of the drug to intrinsic cell surfaces
- Examples
  - Penicillin leading to:
    - Hemolytic anemias, leukopenia, thrombocytopenia



Source: Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78

Type III Reaction

- Involves antigen-antibody complexes with an activation of complement and release of lysosomal enzymes
- Results in fever, rheumatic features, rashes, inflammation and vasculitis
- Presents as serum sickness
  - Lymphocyte Immune Globulin
  - Antitoxins (tetanus IG)
  - Penicillins, Sulfonamides

Presentation of Serum Sickness

Source: Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78

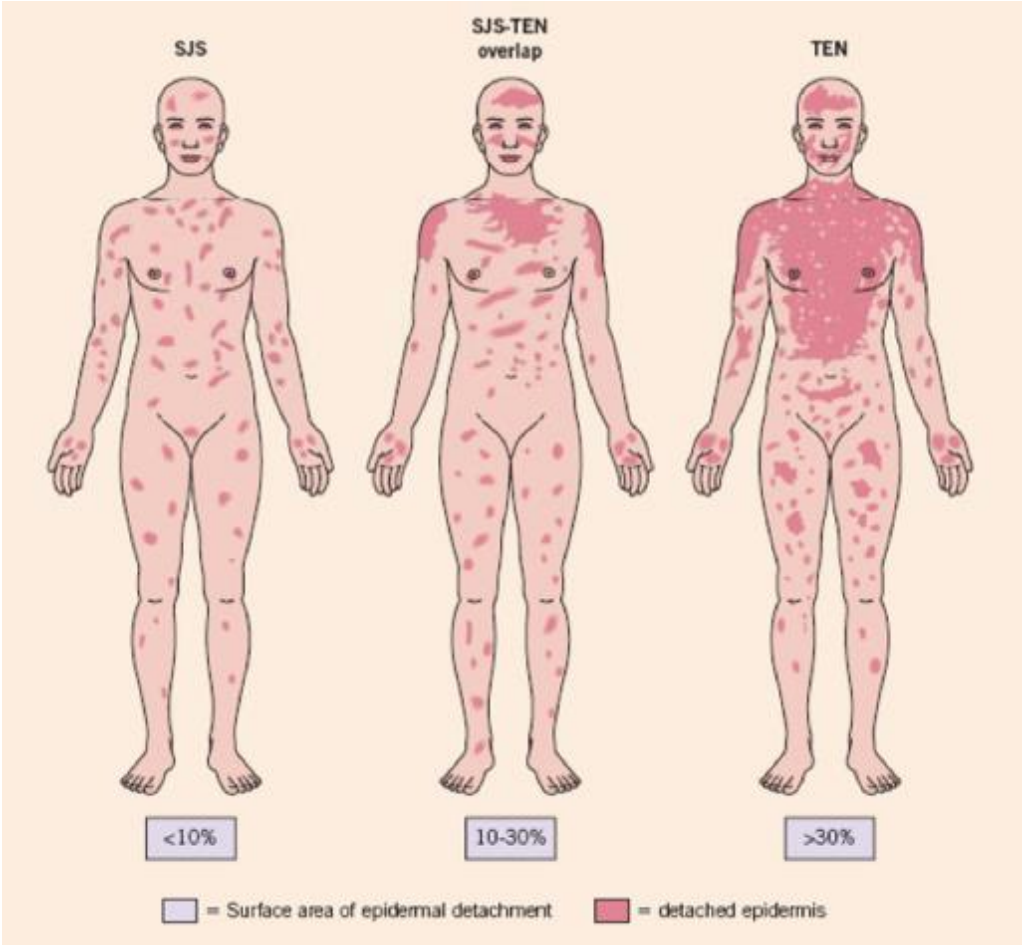
Type IV Reaction

- Reaction of CD4+ helper T-cells via recognition of a foreign antigen on an antigen presenting cell (APC) with no antibody involvement
- Presents as a hypersensitivity in varying degrees:
  - Allergic contact dermatitis
  - Stevens-Johnson Syndrome (SJS) / Toxic Epidermal Necrolysis (TEN)
  - Drug reaction with eosinophilia and systemic symptoms (DRESS)
  - Drug-induced Hypersensitivity Syndrome (DiHS)

Source: Solensky R, et al. *Ann Allerg Asthma IM*. 2010;105:273e1-e78

Stevens-Johnson Syndrome (SJS) / Toxic Epidermal Necrolysis (TEN)

- Recognized as a severe adverse cutaneous drug reaction involving skin and mucous membranes
- Potentially immune-mediated reaction to an antigenic drug-host tissue complex or an interaction with an immune system component (e.g. HLA-B*1502)



Sources:
Bolognia and Bastuji-Garin S, et al. *Arch Derm*.1993;129:92
Harr T, et al. *Orphanet J Rare Dis*. 2010;5:39
Eginli A, et al. *Ann Allergy Asthma Immunol*. 2017;118:143-147

Spectrum of SJS / TEN

Associated high risk drugs

- Allopurinol
- Sulfonamide-antibiotics
- Beta-lactams (aminopenicillins, cephalosporins)
- Quinolones
- Antiepileptics (carbamazepine, phenytoin, phenobarbital)
- Oxicam-type NSAIDs (meloxicam)

Source: Harr T, et al. *Orphanet J Rare Dis.* 2010;5:39

POLLING QUESTION 1:

AI is a 26 YO F who presents with shortness of breath, spreading skin rash and lightheadedness to the ED. She mentions a new medication started earlier today and taken an hour ago. What type of hypersensitivity reaction does the patient potentially have?

A. Type I
B. Type II
C. Type III
D. Type IV

QUESTION 1 RESPONSE:

AI is a 26 YO F who presents with shortness of breath, spreading skin rash and lightheadedness to the ED. She mentions a new medication started earlier today and taken an hour ago. What type of hypersensitivity reaction does the patient potentially have?

A. **Type I**
B. Type II
C. Type III
D. Type IV

BETA LACTAM ANTIBIOTICS

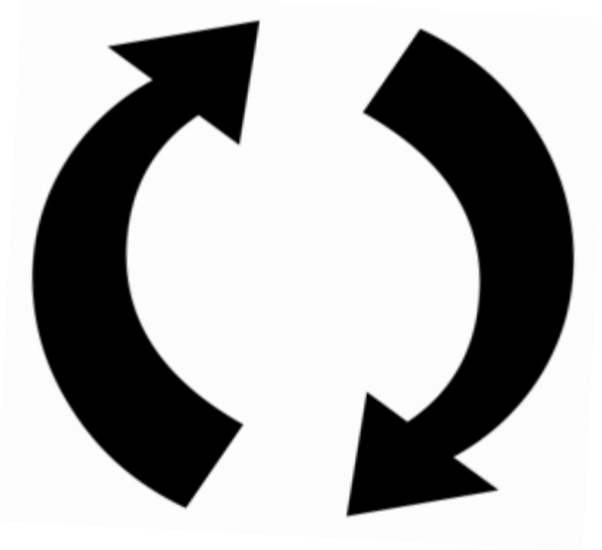
Beta-Lactam Antibiotics

- Penicillins
  - Thiazolidine Ring
- Cephalosporins
  - Dihydrothiazine Ring
- Carbapenems
  - Dihydropyrrole Ring
- Monobactams
  - No direct ring attachment

Source: Terico AT, et al. *Journal of Pharmacy Practice*. 2014;27(6):530-544

Cross Sensitivity

- Agents with similar chemical structures can trigger an allergic reaction
- Similarity of the chemical structure of the drug and drug-class in question is important



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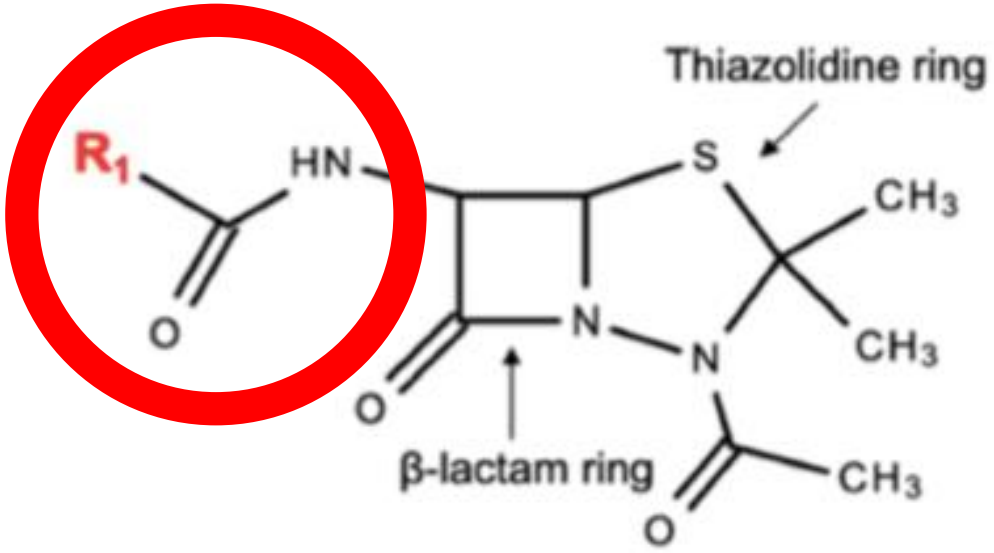
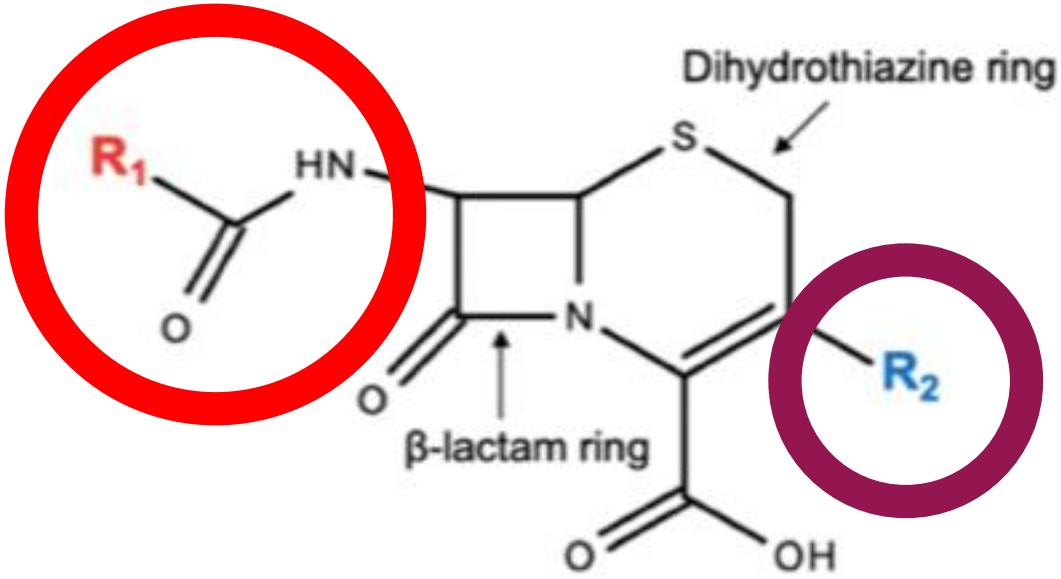
Beta-Lactam Antibiotics



Penicillin Core Structure



Cephalosporin Core Structure

Source: Chaudhry SB, et al. *Pharmacy(Basel)*. 2019;7(3):103

Penicillins

- One of the most common drug reactions
  - General population reports up to 5-10% to penicillin
- Studies conclude that 80-95% of patients do not have a true penicillin allergy
- Immunogenicity arises from major and minor determinants
  - Penicilloyl - MAJOR
  - Penicillate – MINOR
  - Benzyl penicillin - MINOR

Source: Gruchalla RS, et al. *N Engl J Med.* 2006;354:601-9

Penicillins

- Hypersensitivity Penicillin Skin Testing
  - Negative predictive value > 97%
  - Positive predictive value ~50%

- Desensitization
  - Establishes a temporary state of tolerance that may otherwise cause a hypersensitivity reaction
  - Usually persists ≤ 48 hours after the last full dose of an antibiotic
  - Involves incremental increases in doses to develop tolerance

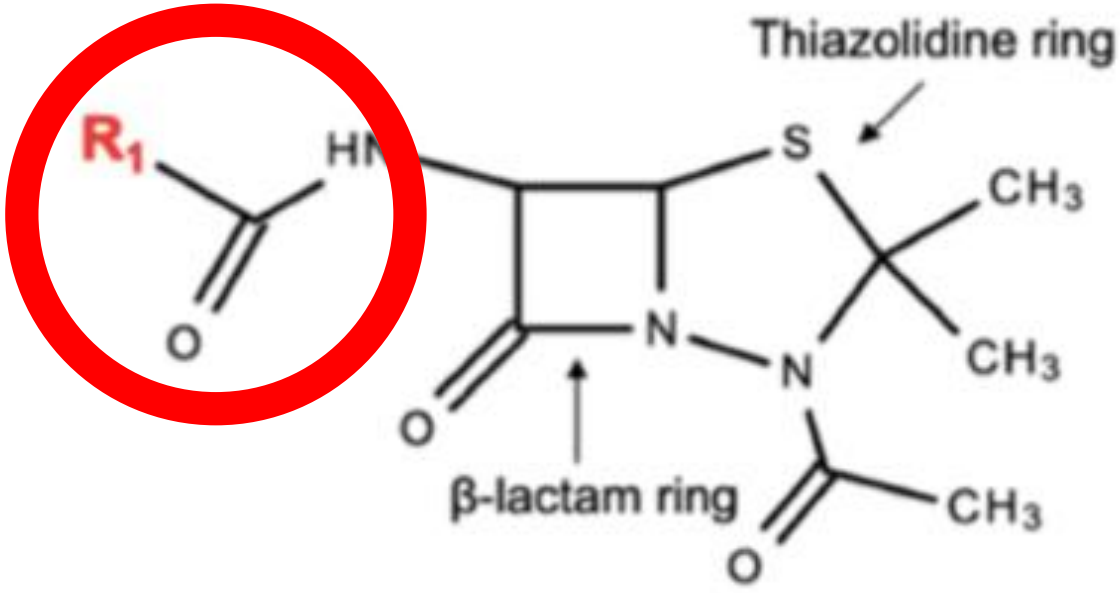
Sources:
Terico AT, et al. *Journal of Pharmacy Practice*. 2014;27(6):530-544
Frumin J, Gallagher JC. *Ann Pharmacother*. 2009;43
Chastain DB, et al. *Pharmacy (Basel)*. 2019;7(3):112

Penicillins versus Cephalosporins

- Cephalosporins are well tolerated with a 1-3% of treated patients having a non-severe adverse reaction
- Side-chain similarity of cephalosporins and penicillins is a significant predictor of cross-sensitivity, but not guaranteed
- Varying studies place cross-reactivity 0 to 10.5% with more recent studies placing at ≤ 6% in patients with confirmed penicillin allergy

Source: Frumin J, et al. *Ann Pharmacother*. 2009;43

Penicillins versus Carbapenems



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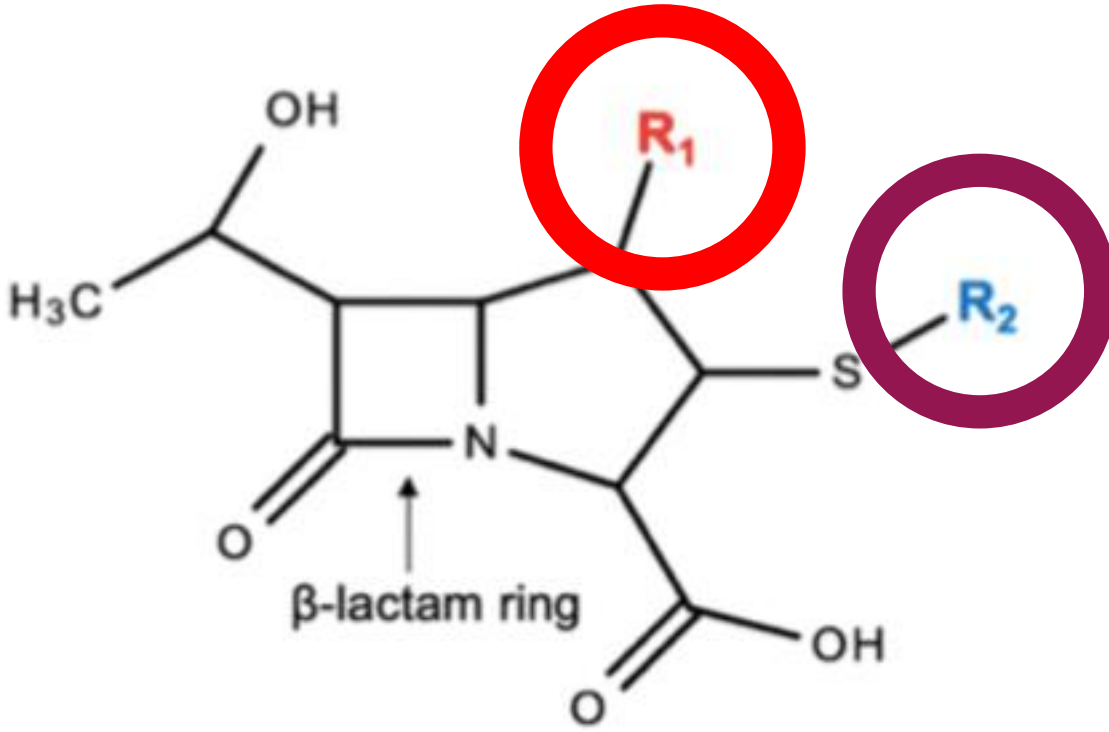


Carbapenem Core Structure

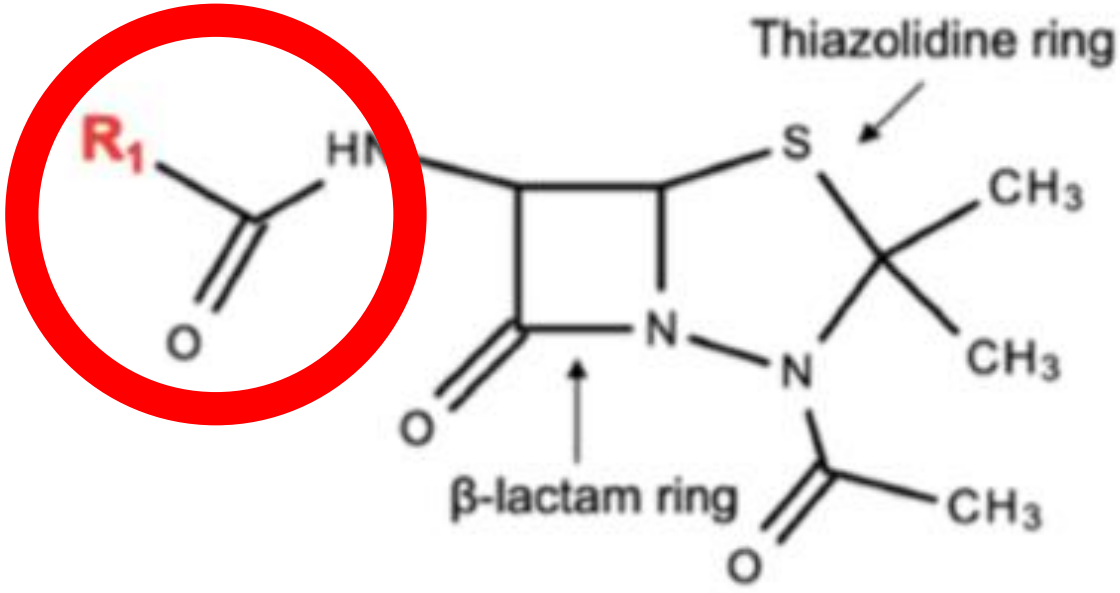
Source: Chaudhry SB, et al. *Pharmacy(Basel)*. 2019;7(3):103

Penicillins / Cephalosporins versus Carbapenems

- Incidence of hypersensitivities for carbapenems is ≤ 2.3%, mostly reported as rash, pruritus, and urticaria
- Cross-reactivity between penicillins and carbapenems is < 1%
- Comparing cephalosporins versus carbapenems, cross-reactivity is ≤ 2% as evaluated by Romano and collogues
  - Based on limited data

Source: Frumin J, et al. *Ann Pharmacother*. 2009;43

Comparison of Penicillin and Monobactam Structure



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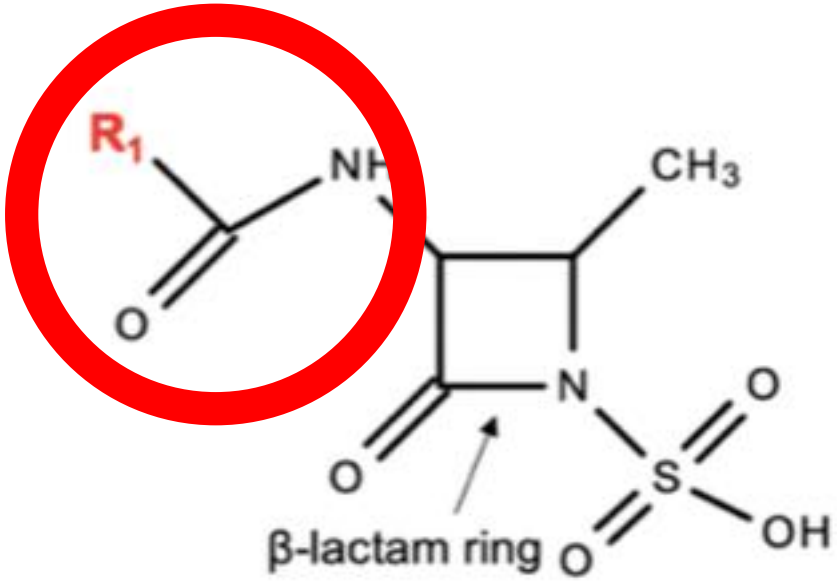


Monobactam Structure

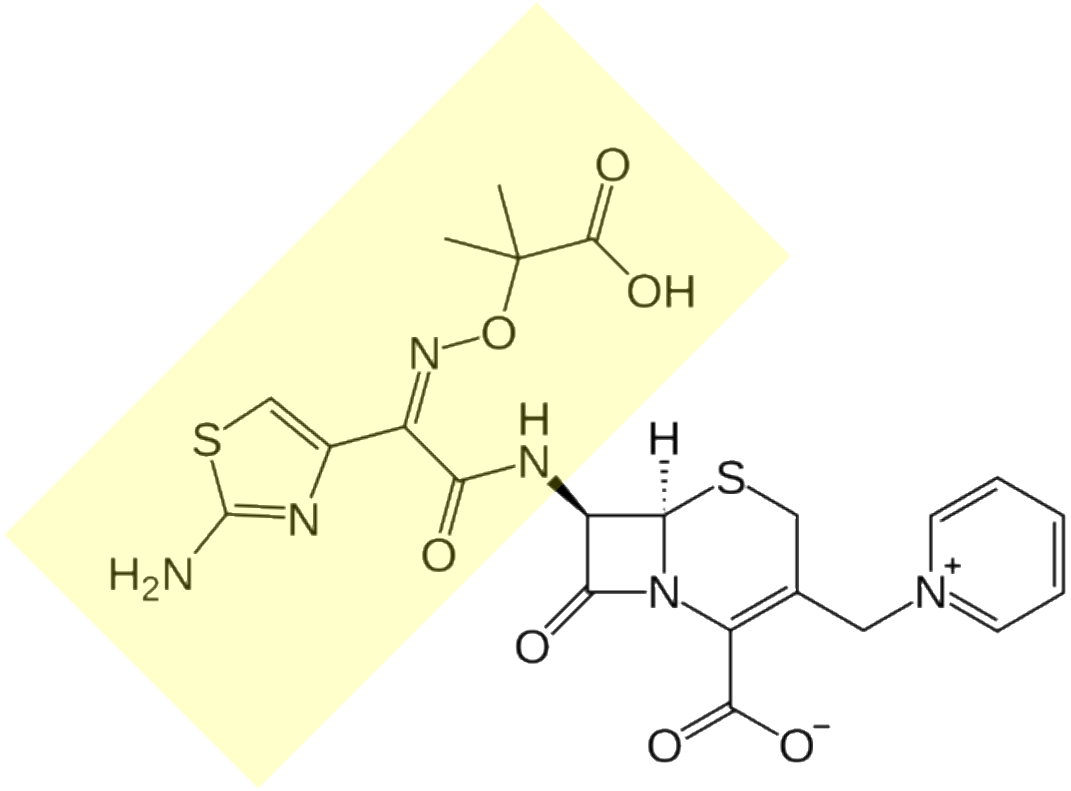
Source: Chaudhry SB, et al. *Pharmacy(Basel)*. 2019;7(3):103

Penicillin / Cephalosporins versus Monobactams

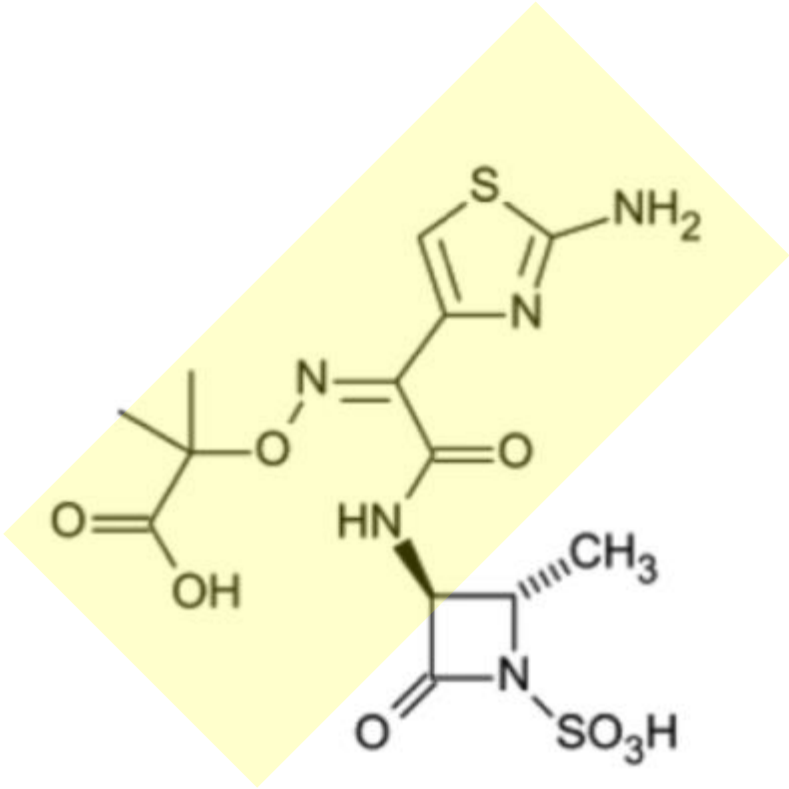
- General immunologic reactions to aztreonam are approximately 2.1%
- Cross-reactivity between penicillins and monobactams is almost 0%
- Cephalosporins generally have low rates of cross-reactivity
  - Romano et al. showed a > 95% tolerance to aztreonam in those allergic to cephalosporin
  - Ceftazidime is an exception and shows cross-reactivity with aztreonam due to a shared side chain

Source: Frumin J, Gallagher JC. *Ann Pharmacother*. 2009;43

Ceftazidime and Aztreonam Cross-Reactivity

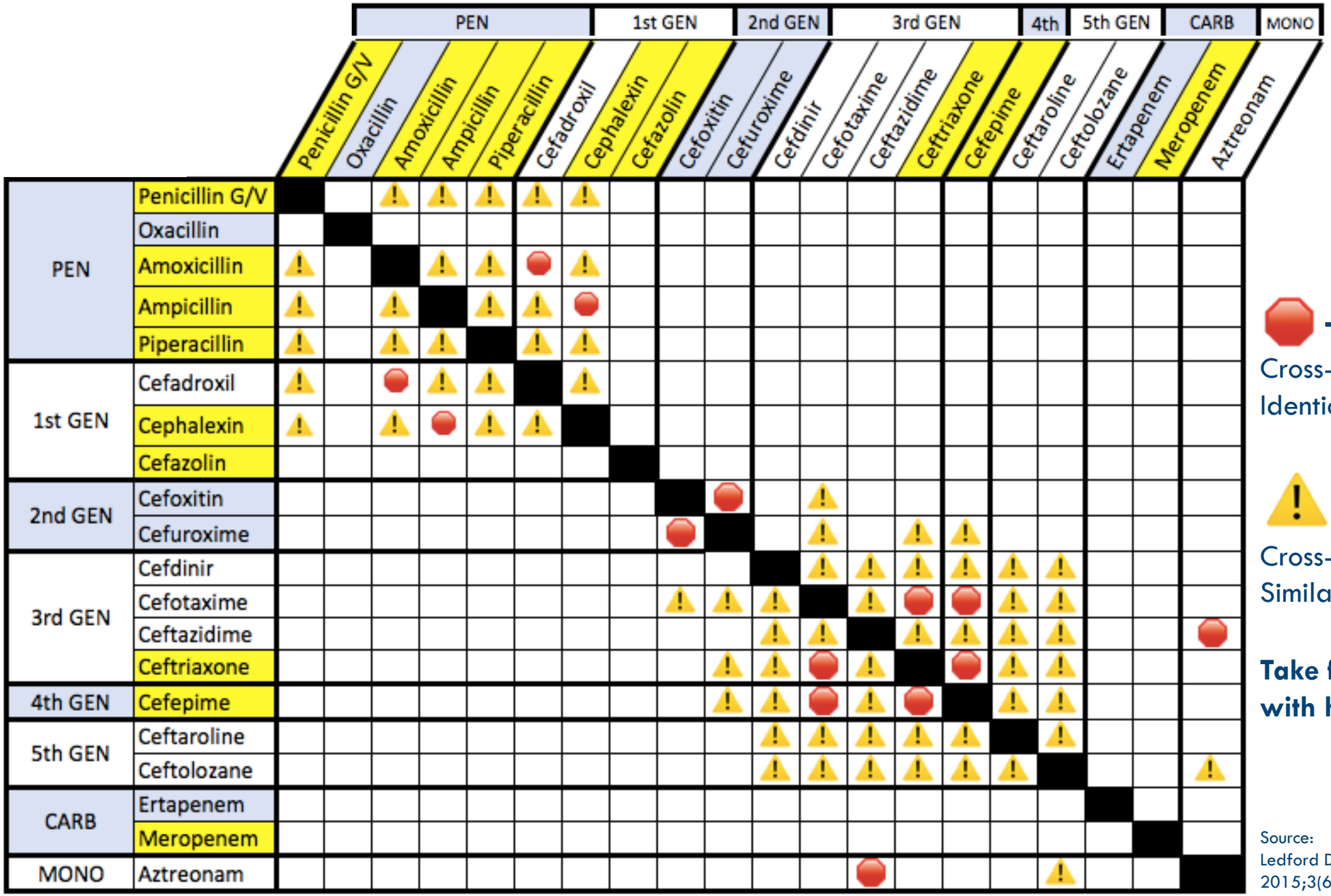


Ceftazidime's Structure



Aztreonam's Structure

Source: Terico AT, et al. *J Pham Pract.* 2014;27(6):530-544



– AVOID

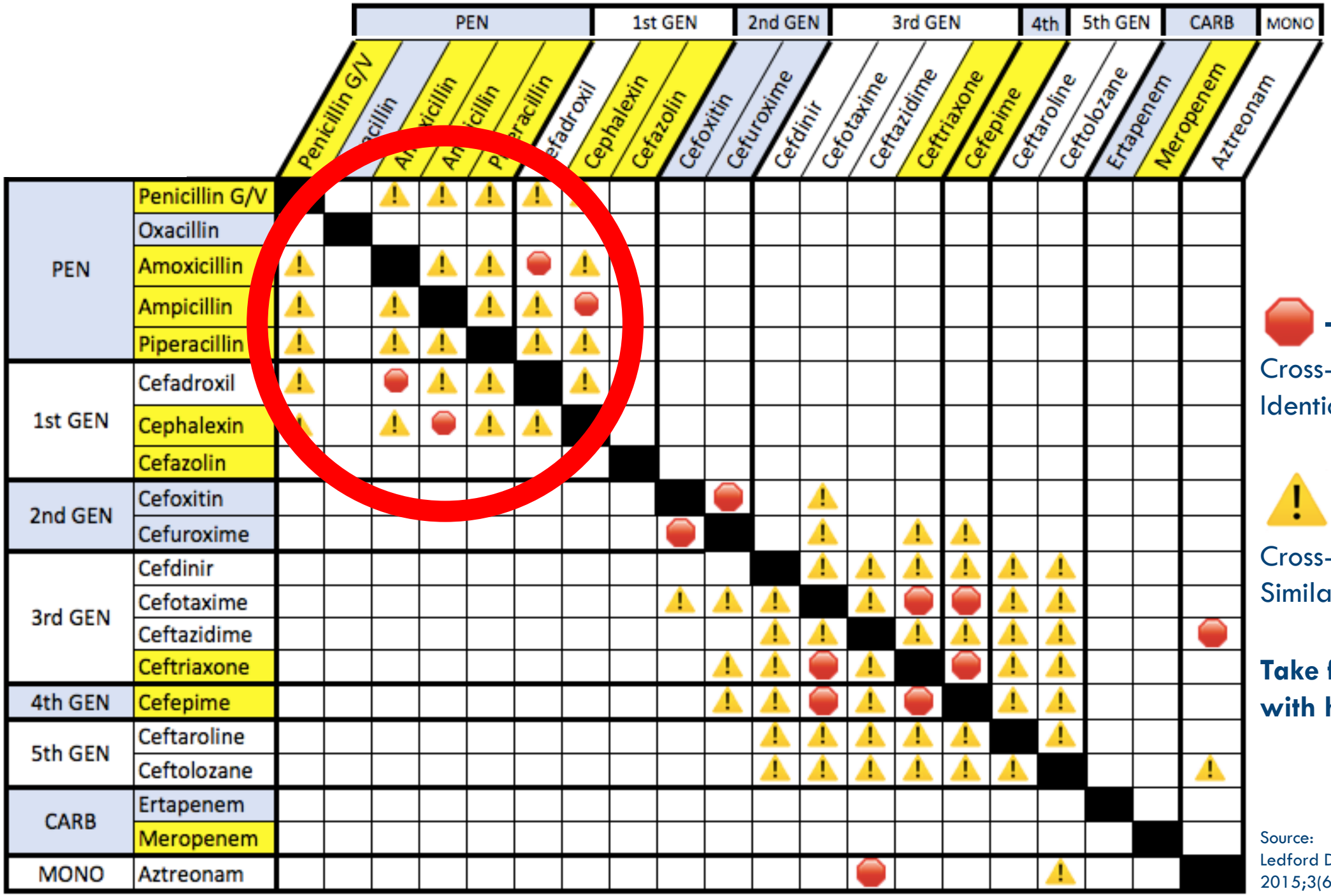
Cross-reaction likely
Identical R1 or R2 side chain

– CAUTION

Cross-reaction less likely
Similar R1 or R2 side chain

Take further caution in those with history of SJS / TENS

Source:
Ledford DK. *J Allergy Clin Immunol Pract.* 2015;3(6):1006-1007



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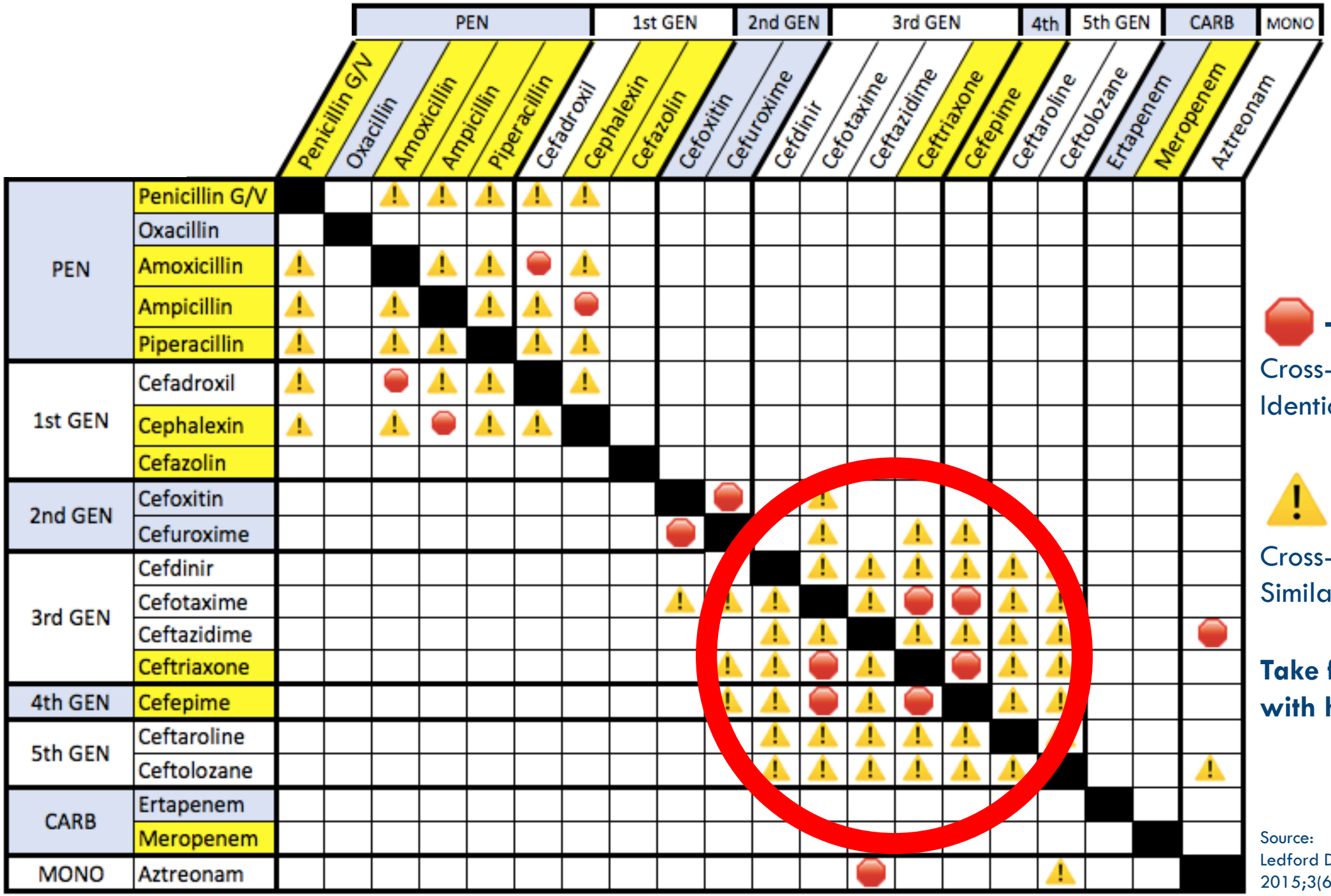

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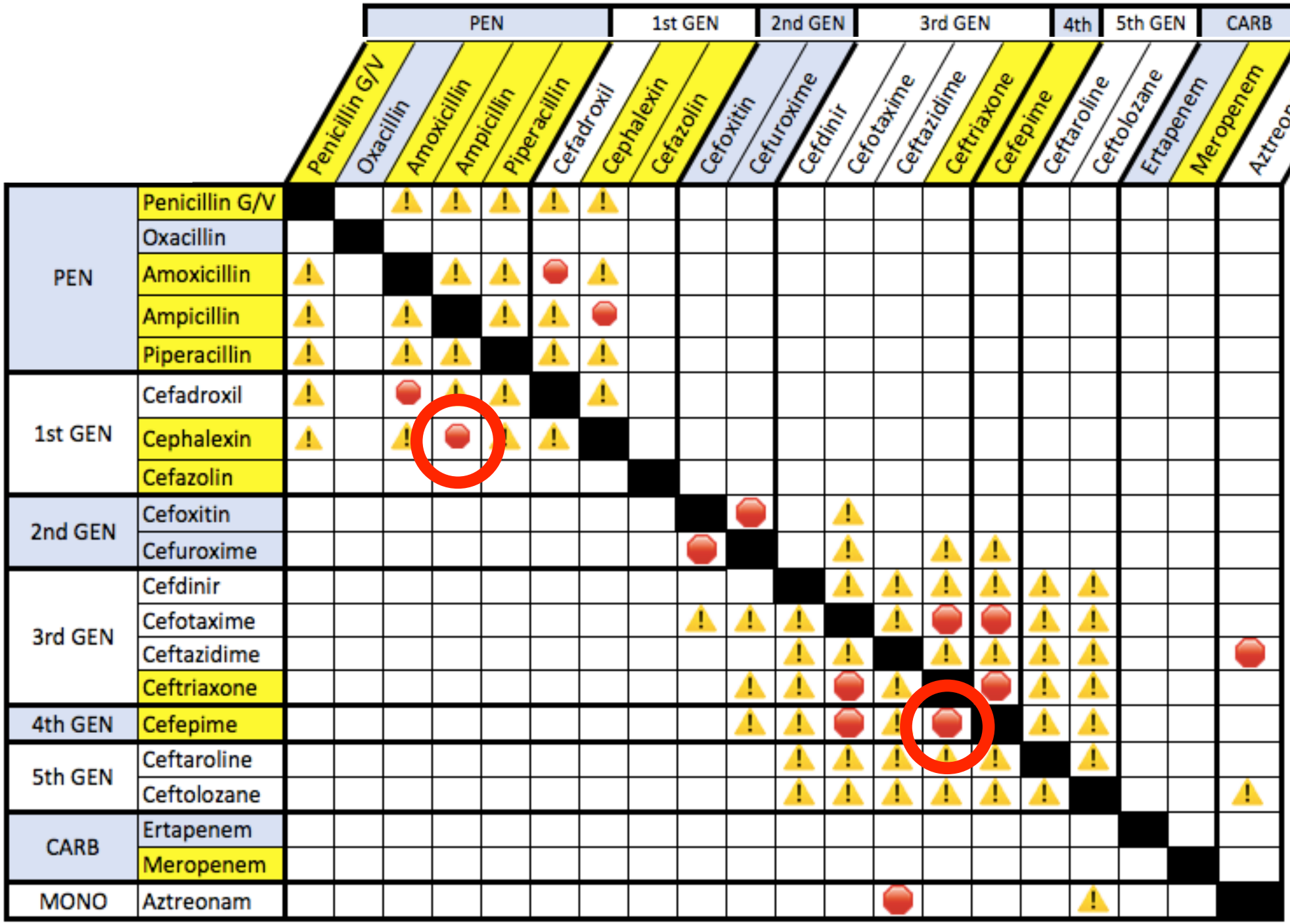

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Relevance of Drug Allergies in Antibiotic Use

- Inaccurate antimicrobial labelling contributes to inappropriate antibiotic selection
- Effect on patients
  - Higher rate of adverse events in those with a documented beta-lactam allergy
- Effect on health-care associated infections and resistance
  - Increased incidence of *C difficile* infection, MRSA and VRE in those with a penicillin allergy

Source:
Blumenthal KG, et al. *Allergy Asthma Proc.* 2014;35(3):197-203
Wu JH, et al. *Can J Hosp Pharm.* 2018;71(1):29-35

Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study

- Study Design
  - Retrospective, matched cohort (n = 51,582)
- Purpose
  - Determine total hospital days, antibiotic exposure, and the prevalence rates of *C difficile,* MRSA, and VRE
- Comparison
  - Patients with and without penicillin "allergy" at hospital admission

Source: Macy E, et al. *J Allergy Clin Immunol*. 2014;133(3):790-6

Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study

- Results
  - Cases with a penicillin allergy had 14% more MRSA, 30% more VRE and 23.1% more *C difficile* infection than control subjects
  - Higher rates of exposure to fluoroquinolones, clindamycin and vancomycin

- Conclusion
  - Potential improvement in clinical outcomes and cost savings may result by performing penicillin allergy testing

Source: Macy E, et al. *J Allergy Clin Immunol*. 2014;133(3):790-6

POLLING QUESTION 2:

Of the beta-lactam antibiotic classes, which has the highest rate of reported drug allergies?

A. Cephalosporin
B. Monobactam
C. Penicillin
D. Carbapenem
E. Beta-lactamase inhibitors

QUESTION 2 RESPONSE:

Of the beta-lactam antibiotic classes, which has the highest rate of reported drug allergies?

A. Cephalosporin
B. Monobactam
c. Penicillin
D. Carbapenem
E. Beta-lactamase inhibitors

SULFAS

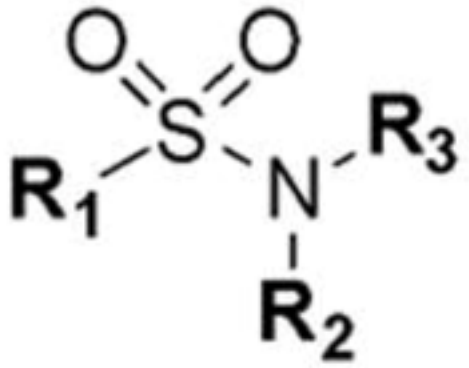
Sulfa Allergies

- May result in various manifestations
  - Maculopapular eruption is the most common reaction but can develop into blistering and mucosal involvements
- Incidence of approximately 3-8% in the general population
  - As high as 30% in those with HIV

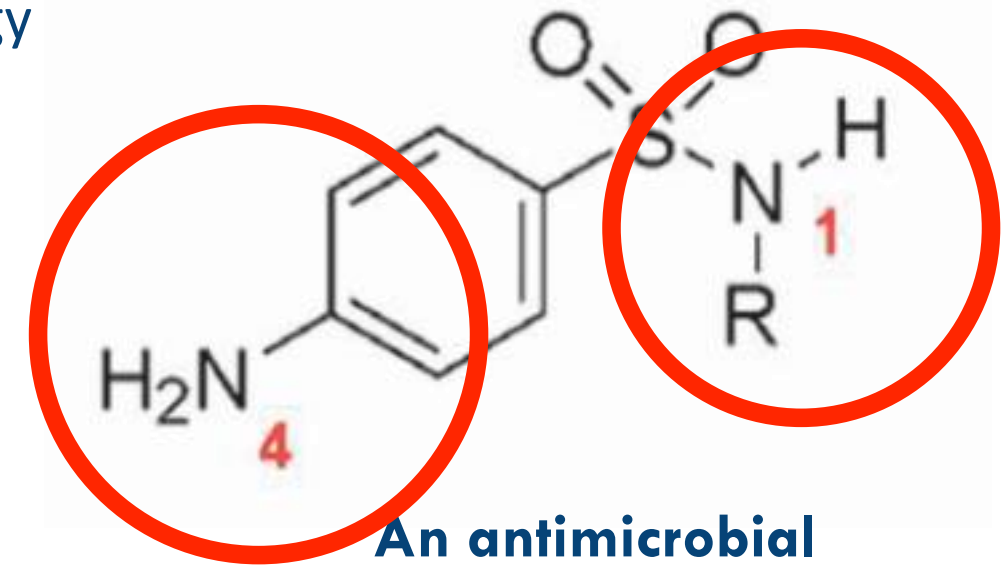
Sources:
Strom BL, et al. *N Eng J Med*. 2003;349:1628-35
Giles A, et al. *Pharmacy (Basel)*. 2019;*7*(3):132

Sulfonamide Antibiotics

- Components of sulfonamide antibiotics determine hypersensitivity
  - **N1** heterocyclic ring
  - **N4** aryl amine
    - Believed to be the primary determinant of allergy
    - Non-antimicrobial sulfonamides lack N4 with an exception of specific antiretroviral agents



Sulfonamide functional group



An antimicrobial sulfonamide

Source: Strom BL, et al. *N Eng J Med.* 2003;349:1628-35

Agents Associated with Sulfa Allergy

Antimicrobial Sulfonamide Agents

Carry a High Risk of cross-reactivity

- Sulfacetamide
- Sulfadiazine
- Sulfamethoxazole
  (as a component of Bactrim)
- Sulfanilamide
- Sulfasalazine

Sources:
Brackett CC, et al. *Pharmacotherapy*. 2004;24(7):856-70
Giles A, et al. *Pharmacy (Basel)*. 2019;7(3):132

Agents Associated with Sulfa Allergy

Non-antimicrobial Sulfonamide Agents

Carry a Low Risk of cross-reactivity*

- COX-2 Inhibitors
- Sulfonylureas
- Thiazide diuretics
- Loop diuretics (except ethacrynic acid)
- Carbonic anhydrase inhibitors (CAIs)
- Triptans
- Miscellaneous (metolazone, tamsulosin, zonisamide)

* Those with a true sulfonamide allergy may be at risk for multiple drug allergy syndrome despite low risk of cross-reactivity

Sources:
Brackett CC, et al. *Pharmacotherapy*. 2004;24(7):856-70
Giles A, et al. *Pharmacy (Basel)*. 2019;7(3):132

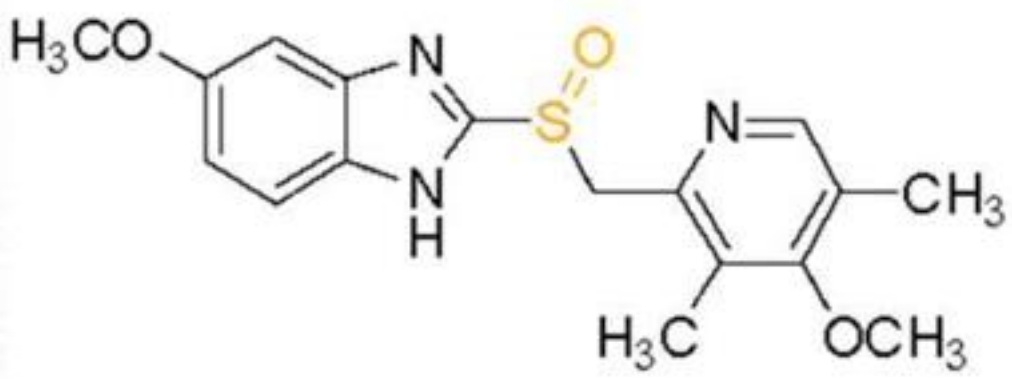
Agents Associated with Sulfa Allergy

Sulfur-containing Agent, but non-sulfonamide

Carry NO Risk of cross-reactivity

- Amoxicillin
- Clopidogrel
- Captopril
- Omeprazole
- Ranitidine
- Spironolactone
- Sulindac

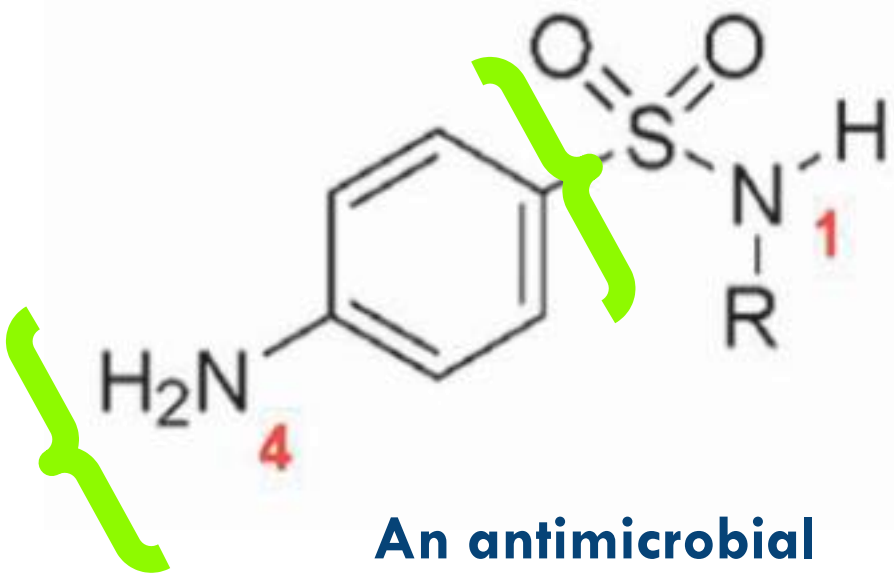
Omeprazole



Sources:
Brackett CC, et al. *Pharmacotherapy*. 2004;24(7):856-70
Giles A, et al. *Pharmacy (Basel)*. 2019;7(3):132

Sulfonamide Cross-Reactivity

- Agents may *lack* a sulfonamide moiety but contain an aryl amine group resembling the N4 group
- Drugs containing an aryl amine group may carry a warning for sulfonamide antibiotic cross-reactivity
  - Benzocaine, dapsone, amprenavir, acebutolol, procainamide



An antimicrobial sulfonamide

Sources:
Brackett CC, et al. *Pharmacotherapy*. 2004;24(7):856-70
Giles A, et al. *Pharmacy (Basel)*. 2019;7(3):132

Sulfonamide Cross-Reactivity

- Allergy to sulfonamide antibiotics alone may be a risk factor for a subsequent allergic reaction to sulfonamide non-antibiotics
  - A penicillin allergy is an equal predisposing risk factor based on prior research

- Non-antimicrobial sulfonamides do not necessarily need to be avoided in those sensitive to sulfonamide antibiotics

Sources:
Brackett CC, et al. *Pharmacotherapy*. 2004;24(7):856-70
Hemstreet BA, et al. *Pharmacotherapy*. 2006;26:551-7

NSAIDs AND ASPIRIN

NSAIDs and Their Effect on COX-1/COX-2

- Full COX-1/COX-2 inhibition
  - Aspirin
  - Ibuprofen
  - Ketorolac
  - Naproxen
  - Indomethacin
  - Diclofenac
- Primary COX-2 inhibitor with little COX-1
  - Celecoxib
- Preferential COX-2 inhibition with partial COX-1
  - Etodolac
  - Meloxicam
- Weak COX-2/COX-1 inhibitors
  - Acetaminophen
  - Mesalamine
  - Sulfasalazine

Source: Modena B, et al. *Immunol Allergy Clin Am*. 2017;37:727-749

NSAIDs

- Cyclooxygenase-1 (COX-1)
  - Primarily responsible for the production of mediators that activate platelets and protect stomach lining, but also promote production of inflammatory mediators
- Cyclooxygenase-2 (COX-2)
  - Responsible for the production of inflammatory mediators

Source: Modena B, et al. *Immunol Allergy Clin Am*. 2017;37:727-749

NSAIDs and Pseudo-Allergies

- Majority of NSAID hypersensitivity reactions are non-immunologically mediated and may be considered ‘pseudo-allergies’
  - Cross-reactive between structurally differing NSAIDs due to changes in the arachidonic acid metabolism
    - Cross-reactivities are expected

Source: Wöhrl S. *Allergo J Int.* 2018;27:114-121

NSAIDs and Pseudo-Allergies

- Patients presenting with urticaria and/or angioedema
  - NSAID-exacerbated cutaneous disease (NECD)
  - NSAIDs-induced urticaria/angioedema (NIUA)

- Patients with respiratory symptoms (bronchial asthma, rhinorrhea)
  - Aspirin or NSAID-exacerbated respiratory disease (AERD or N-ERD)

Source: Wöhrl S. *Allergo J Int.* 2018;27:114-121

Aspirin-Exacerbated Respiratory Disease (AERD)

- Triad of Symptoms
  - Asthma
  - Sinus disease with recurrent nasal polyps
  - Sensitivity to aspirin and other NSAIDs

- Experienced by approximately 9% of all adults and 30% of patients with asthma and nasal polyps

Source: Cortellini G, et al. *Curr Opin Allergy Clin Immunol*. 2017;17:247-54

Aspirin-Exacerbated Respiratory Disease (AERD)

- Management
  - Avoidance
  - If symptoms continue
    - Acetaminophen 500 mg PO Q6h PRN
  - Leukotriene receptor antagonist
    - Montelukast
  - Inhaled corticosteroids for asthma symptoms

Sources:
Kowalski ML, et al. Immunol Allergy Clin N Am. 2013;33:135-45
Cortellini G, et al. *Curr Opin Allergy Clin Immunol*. 2017;17:247-54

NSAIDs and True Allergies

Single NSAID-induced delayed reactions (SNIDR)

- T-cell mediated type IV allergy with a delayed onset and may present as mild maculopapular eruption to severe SJS / TEN

Single-NSAID-induced urticarial/angioedema or anaphylaxis (SNIUAA)

- IgE-mediated type I allergy presenting as a hypersensitivity to a single agent or single group with similar structure

Source: Wöhrl S. *Allergo J Int.* 2018;27:114-121

Tolerance with Acute, Cross-Reactive NSAID Hypersensitivity

Frequently cross-reactive NSAID **(60-100%)**	Rarely cross-reactive NSAID **(2-10%)**	Generally tolerated NSAID **(not tolerated only in isolated cases)**
• Aspirin • Ibuprofen • Indomethacin • Naproxen • Diclofenac • Ketorolac • Other less frequently used NSAIDs	• Acetaminophen • Meloxicam	• Celecoxib • Newer COX-2 inhibitors *not approved in USA*

Source:
Wedi B. *Allergo J Int.* 2017;26:204–211
Modena B, et al. *Immunol Allergy Clin Am.* 2017;37:727-749
Kowalski ML, et al. *Allergy.* 2011;66:818-29

POLLING QUESTION 3:

Which agent is the least cross-reactive in those with an NSAID hypersensitivity to ketorolac?

A. Naproxen
B. Ibuprofen
C. Acetaminophen
D. Celecoxib

QUESTION 3 RESPONSE:

Which agent is the least cross-reactive in those with an NSAID hypersensitivity to ketorolac?

A. Naproxen
B. Ibuprofen
C. Acetaminophen
D. Celecoxib

EVALUATION, PREVENTIONS AND MANAGEMENT OF AN ALLERGIC REACTION

Prevention of Drug Allergy

- Proper history taking and skin testing if possible
- Oral route may be preferred to other routes
- In patients who are allergy prone/multiple drug allergies, avoid drugs known for causing allergic reactions due to multiple drug allergy syndrome

Source: Choosing Wisely. *American Academy of Asthma, Allergy and Immunology*. 2012

Evaluation of Drug Allergy

- Manifestation of the hypersensitivity
- Prior allergic history
- Route of administration
- Severity of the hypersensitivity
- Temporal relation
- Response to treatment

POLLING QUESTION 4:

DF is 44 YO M with a prior documented allergy to a beta-lactam, specifically cefazolin, presenting as mild hives during childhood. Physician consults you for a recommendation in choosing an alternative beta-lactam agent.

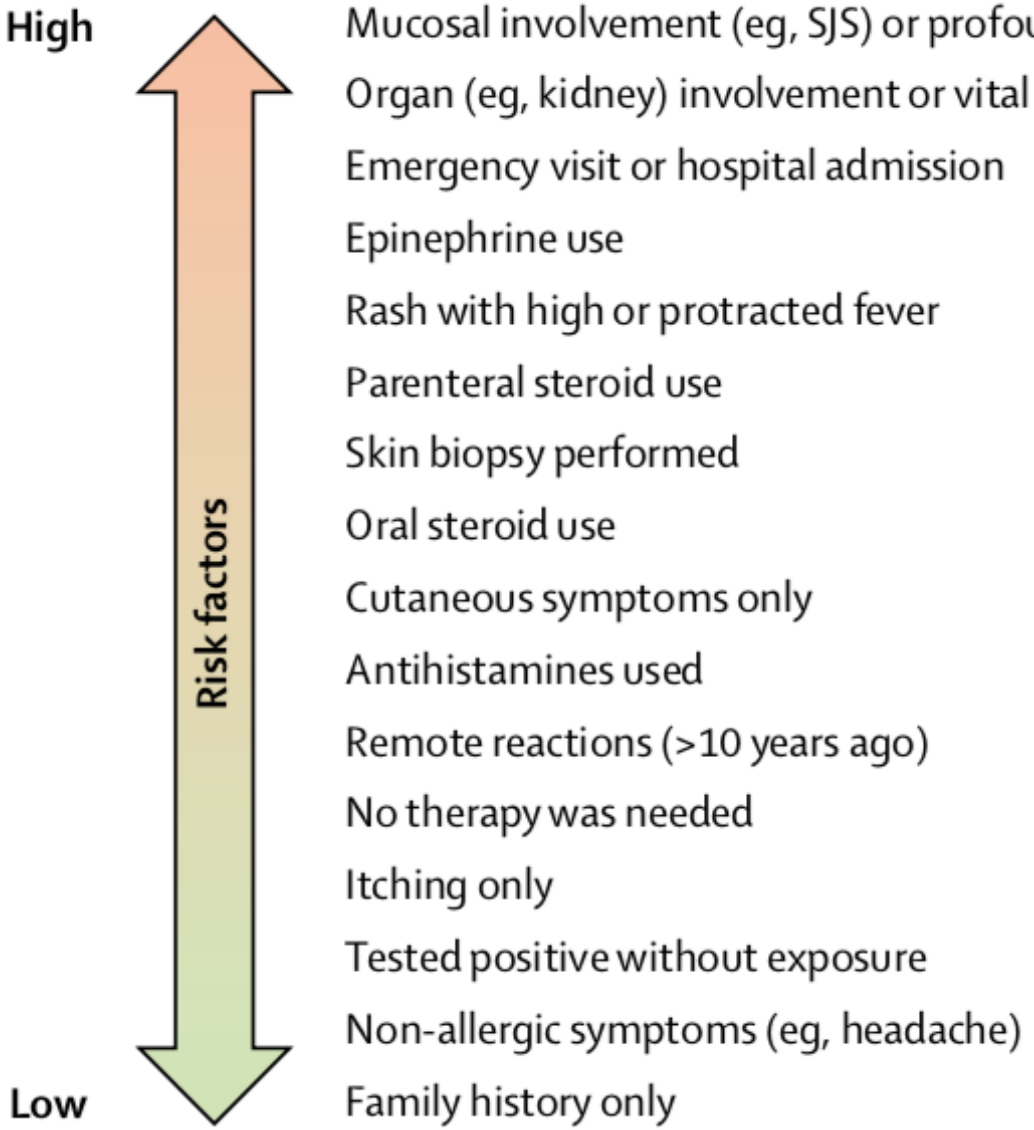
A. Cefepime
B. Cefoxitin
C. Nafcillin
D. Avoid beta-lactam class
E. A, B and C

QUESTION 4 RESPONSE:

DF is 44 YO M with a prior documented allergy to a beta-lactam, specifically cefazolin, presenting as mild hives during childhood. Physician consults you for a recommendation in choosing an alternative beta-lactam agent.

A. Cefepime
B. Cefoxitin
C. Nafcillin
D. Avoid beta-lactam class
E. **A, B and C**

Evaluation of Drug Allergy



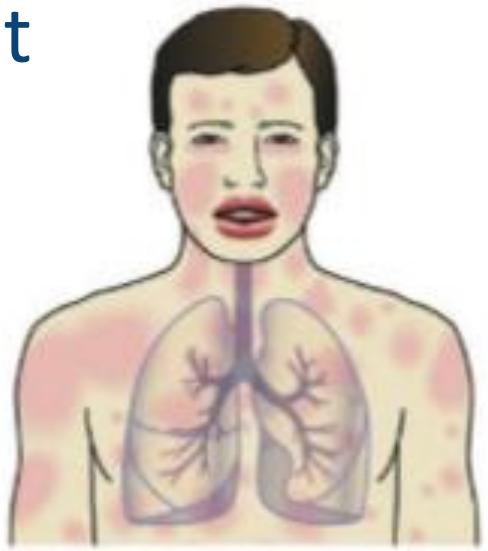
Source: Blumenthal KG, et al. *Lancet*. 2019; 393: 183-98

Management of Drug Allergy

- Pre-Medication
- Test Dosing
- Desensitization

Management of Acute Systemic Reaction

- Assess circulation, airway and breathing
- Inject epinephrine 0.01 mg/kg IM (MAX 0.5 mg adult or 0.3 mg child)
- As necessary
  - May initiate high-flow oxygenation support at 6-10 L/minute
  - Administer 1-2 L of 0.9% normal saline (5-10 mL/kg in the first 5-10 minutes)



Source: Simmons FE, et al. *World Allergy Organ J*. 2011;4(2):13–37

POLLING QUESTION 5:

Patient PK is describing their previous drug allergy. PK experienced it after a course of amoxicillin with an upset stomach and frequent diarrhea, headache and nausea. Patient has a history of sulfa allergy to sulfasalazine. Is the patient experiencing an intolerance or true allergy?

A. Intolerance
B. True Allergy
C. Need more information

QUESTION 5 RESPONSE:

Patient PK is describing their previous drug allergy. PK experienced it after a course of amoxicillin with an upset stomach and frequent diarrhea, headache and nausea. Patient has a history of sulfa allergy to sulfasalazine. Is the patient experiencing an intolerance or true allergy?

A. **Intolerance**
B. True Allergy
C. Need more information

Patient Case

- MB is 58 YO male with past medical history of HTN, HLD, T2DM, and HF.
- Allergy: sulfadiazine - rash
- Current medication list
  - Lisinopril 10 mg PO daily
  - Metformin 1 g PO BID
  - Glipizide 5 mg PO daily
  - Carvedilol 12.5 mg PO BID

POLLING QUESTION 6:

Patient has the following new orders. Which of the following orders are you comfortable with?

A. Trimethoprim/sulfamethoxazole 1 SS PO BID
B. Furosemide 20 mg PO daily
C. Omeprazole 20 mg PO daily
D. None of the above
E. B and C

QUESTION 6 RESPONSE:

Patient has the following new orders. Which of the following orders are you comfortable with?

A. Trimethoprim/sulfamethoxazole 1 SS PO BID
B. Furosemide 20 mg PO daily
C. Omeprazole 20 mg PO daily
D. None of the above
E. **B and C**

Patient Case

- JG is 62 YO female presenting to the ED with pain 9/10. Patient was ordered morphine 4 mg IV push. Pain was relieved, but a rash appeared on her face with some flushing. Patient is not complaining of any other symptoms or shortness of breath.

- Is this patient experiencing a drug allergy?

Key Points

- Proper assessment needs to be done to verify the validity of a presenting allergic reaction
- Cross-reactivities between beta-lactam antibiotics are associated with side-chain similarity
- Sulfa allergies depend on the sulfonamide moiety and cross-reactivity between antibiotic and non-antibiotic sulfas are low
- NSAIDs and aspirins have a risk of cross-sensitivity, but a careful assessment is required to assess whether it is a true allergy or pseudoallergy

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THANK YOU!

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