



The Atopic March, Allergy Treatments, and the Rise of the Food Allergy Epidemic

Cornell HEART

Table of Contents



1

Significance and Development

2

Types of Allergies

3

Common Food Allergy Pairs

4

Allergic Reactions & Immune Response

5

Diagnosis & Treatment

01

Significance and Development of Allergies



Why allergies?



1 in 4
Children in the US

Have seasonal allergies, eczema, or food allergies (2021).



1 in 3
Adults in the US

Have seasonal allergies, eczema, or food allergies (2021).



4.1 Million
Physician office visits

For allergic rhinitis as the primary diagnosis.



229,000
ER Visits

For contact dermatitis or other eczema as the primary diagnosis.

The Atopic March

Progression of allergic diseases in children

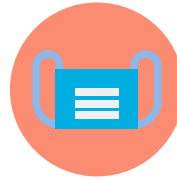
Food Allergies

Hives, stomach cramps, diarrhea, vomiting, and could lead to anaphylaxis.



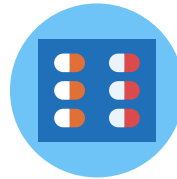
Allergic Asthma

Wheezing, shortness of breath, coughing, chest tightness, increased mucus, triggered by allergens.



Atopic Dermatitis

Dry, itchy red skin often with rashes. Located on elbows, behind knees, around the face.

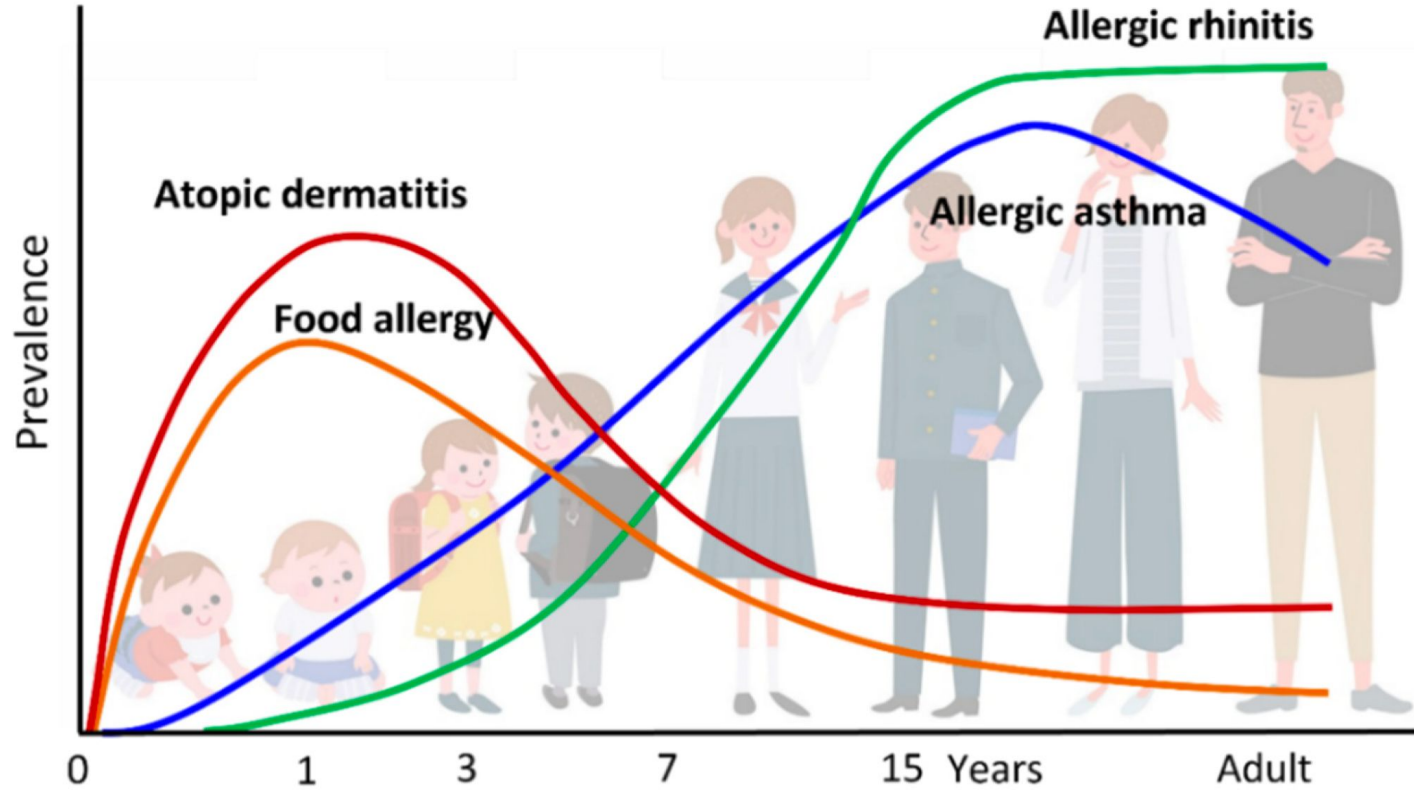


Allergic Rhinitis

Hay fever. Runny nose, sneezing, itchy or watery eyes. Triggered by pollen or dust mites.

***Having one does not guarantee that you will have the others, but does serve as a risk factor progressive conditions.**

Timeline of the Atopic March



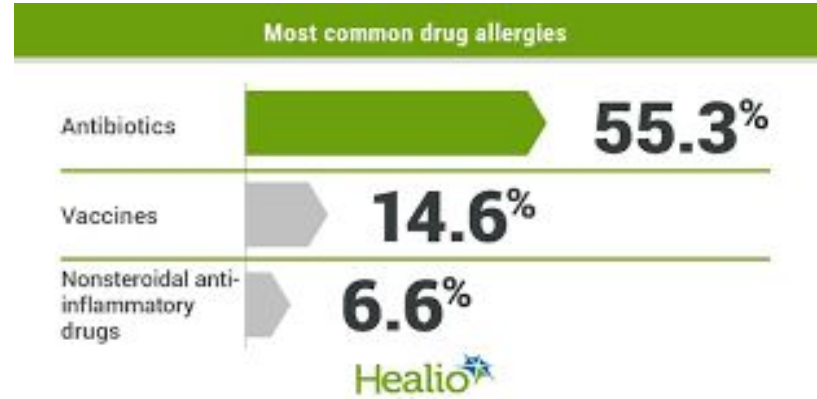
02

Types of Allergies



1) Drug Allergy

- Most drug reactions are not allergic but are side effects of the medicine.
- A true diagnosis of a an allergic reaction from a drug can be obtained from patient history, symptoms, and skin testing.



2) Food Allergy

- IgE mediated
 - Body immune system makes immunoglobulin E (antibodies) which could react with certain foods and cause a reaction.
- Non-IgE mediated
 - Other aspects of the body's immune system response that cause a reaction, yet do not involve the IgE antibody.



3) Insect Allergy

- Stinging and biting insects cause minor symptoms in most people, however, they can rarely cause a life-threatening allergic reaction (anaphylaxis).
- Non-stinging and non-biting insects can also cause an allergic response similar to symptoms of the common cold that last for up to months. They can also trigger asthma symptoms/attacks.



4) Latex Allergy

- Latex is a protein found from rubber tree sap found in Africa and Southeast Asia. Many natural rubber products contain this sap.
 - Allergic reactions can occur from direct contact, breathing in latex fibers, or from fruit that have cross-reacted with latex.
 - Synthetic latex does not contain the sap and therefore does not cause latex allergic reactions.



5) Mold Allergy

- Mold is a type of fungus that creates spores that float through the air in moist/damp environments (others in dry/ windy weather).
- There are different types of mold and they can grow indoors and outdoors.
- Mold can cause “hay fever” symptoms and trigger asthma.



6) Pet Allergy

- Allergies to pets with fur (such as cats and dogs) affect 10-20% of the world's population.
- Specifically, the allergic reaction is from proteins found in the pet's dead skin cells, saliva, and urine. When these proteins get into the airway, nose, eyes, mouth, etc. it can cause an allergic reaction.



7) Pollen Allergy

- Many people refer to it as “hay fever”. Experts mostly refer to it as “seasonal allergic rhinitis”.
- Pollen commonly triggers seasonal allergies.
- Symptoms include: Runny nose (rhinorrhea), stuffy nose, sneezing, red and watery eyes, etc.
- Pollen can make asthma worse in some individuals.
- You can reduce allergic reactions to pollen by taking allergy treatments before pollen season begins

Pollen Seasons in the U.S.

February – May: **Trees** (some start as early as December or January)

April – June: **Grasses**

July – November: **Weeds**

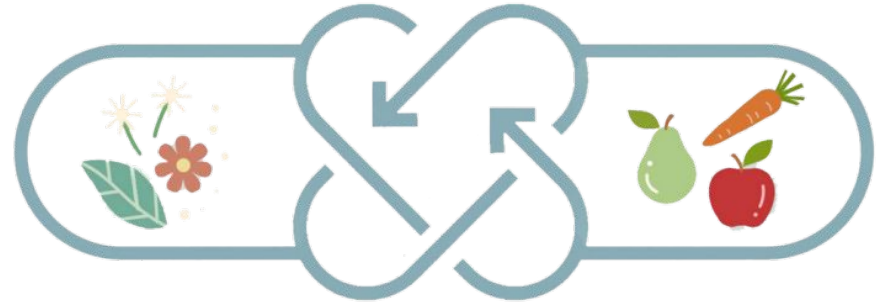


03

Common Food Allergy Pairs



What is cross-reactivity?



→ Cross-reactivity is when a person allergic to one substance also experiences an allergic reaction to a different, but often, related substance.



























































^ most commonly seen with food allergies

How does cross-reactivity work?

→ Cross reactivity occurs when antigens of one substance are similar to the antigens of another.
> Thus, an antibody directed against one substance is also able to bind with the other substance's antigen – inducing an allergic response to both substances.

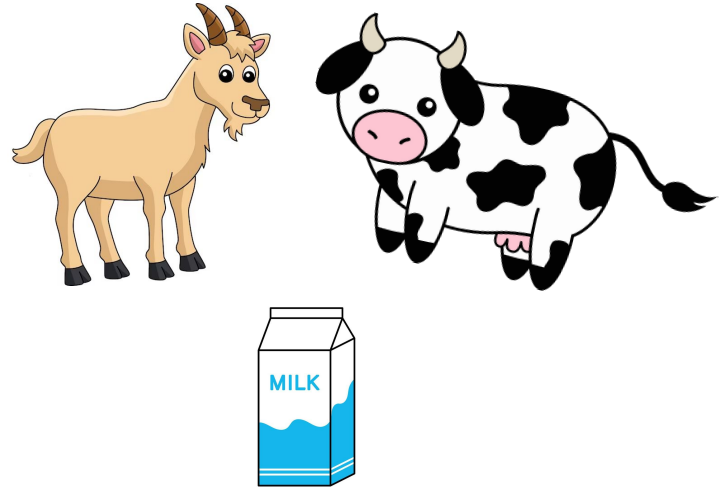
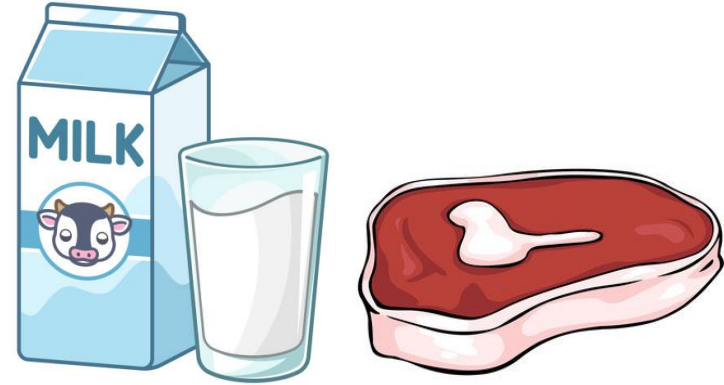
Cross-Reactive Foods Chart

Research on Likely Cross-Reactions Between Foods(2):

If Allergic to:	Risk of Reaction to at Least One:	Risk:
A legume* peanut 	Other legumes peas  lentils  beans 	5% 
A tree nut walnut 	Other tree nuts brazil  cashew  hazelnut 	37% 
A fish* salmon 	Other fish swordfish  sole 	50% 
A shellfish shrimp 	Other shellfish crab  lobster 	75% 
A grain* wheat 	Other grains barley  rye 	20% 
Cow's milk* 	Beef hamburger 	10% 
Cow's milk* 	Goat's milk goat 	92% 
Cow's milk* 	Mare's milk horse 	4% 
Pollen birch  ragweed 	Fruits/vegetables apple  peach  honeydew 	55% 
Peach* 	Other Rosaceae plum  pear  apple  cherry 	55% 
Melon* cantaloupe 	Other fruits watermelon  banana  avocado 	92% 
Latex* latex glove 	Fruits kiwi  banana  avocado 	35% 
Fruits kiwi  avocado  banana 	Latex latex glove 	11% 

1. Milk and Beef

> Studies have shown that children allergic to beef can have up to a 93% risk for being allergic to milk

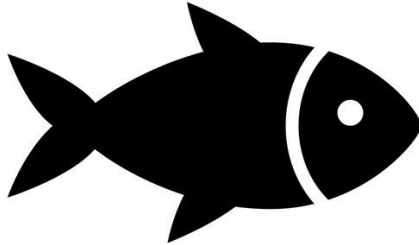


2. Cow's Milk and Milk from Other Mammals

> risk of allergy to other mammal's milk like goats and sheep for someone with a cow milk allergy is 90%

3. Peanut and Tree-Nut

^ 35% of toddlers with a peanut allergy in the U.S. have or will develop a tree nut allergy

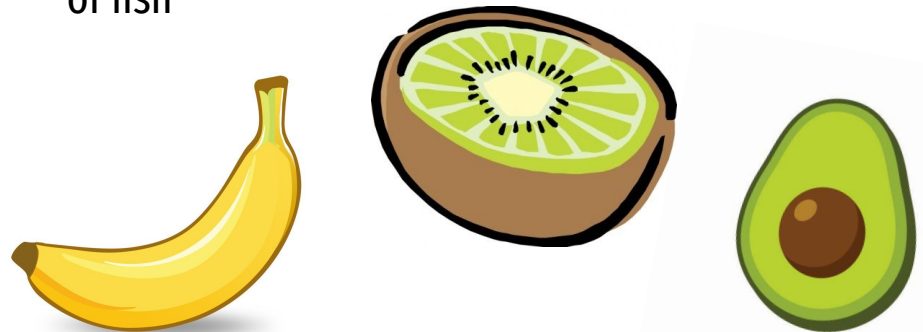


4. Different fish species

^ about a 50% increased risk of allergy to other fish when you are allergic to one type of fish

5. Latex and Fruits

^ 30-50% of people with latex allergies also experience symptoms with fruit cross-reactive with latex – such as banana, avocado, and kiwi

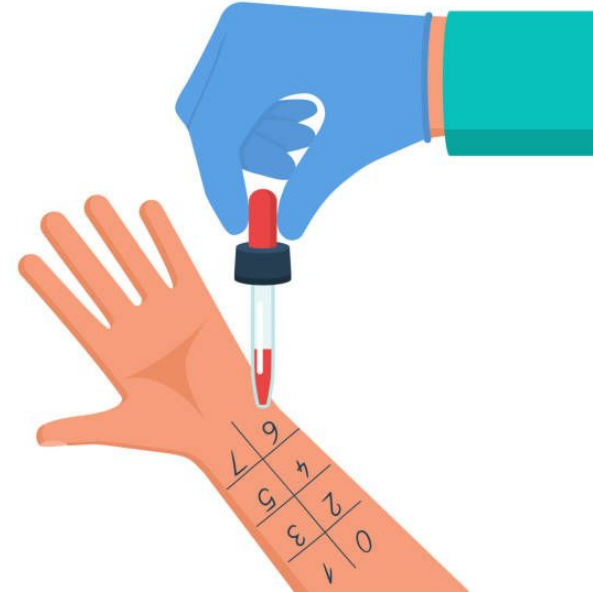


The Implications of Cross-Reactivity

How does this affect allergy testing?

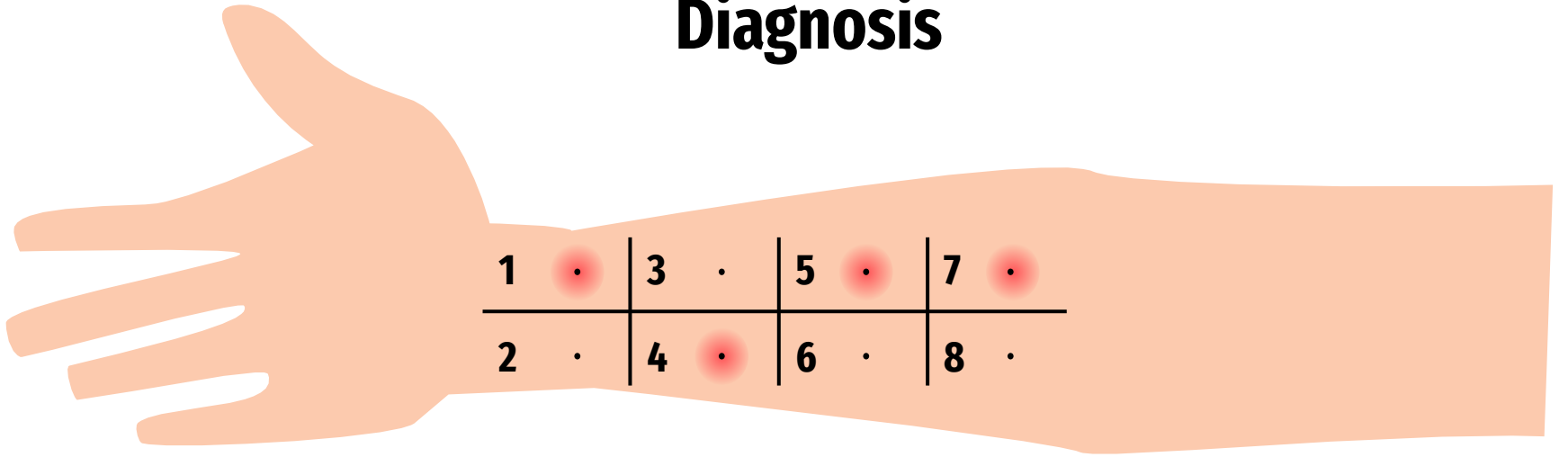
→ Cross reactivity results in difficulty to test and diagnose food allergies because a positive skin or blood test for one substance may be misleading in that the patient is actually allergic to a substance cross-reactive to what they tested for.

ex. someone may test positive for a salmon allergy, but really their original allergy is for tuna so they may unknowingly eat tuna thinking they are not allergic to it!



05

Diagnosis



How are allergies diagnosed?

- History taking
 - Doctors will ask questions about family history, lifestyle, environment, medications, etc
 - Patient's account of symptoms
- Allergy tests
 - They usually don't determine how severe an allergy is
 - Common allergy tests on the next few slides

Common allergy tests

- Skin prick test: a small drop of an aqueous solution of the allergen is placed on the skin, and then the skin is pricked/scratched through the drop with a needle
 - Sensitive if redness, swelling, itching, or wheals (raised round area on the skin) within 15 minutes
 - This alone does not diagnose the allergy
 - Usually used for inhaled, food, or occupational allergens
- Intradermal skin test: the allergen is injected under the outer layer of the skin
 - Usually used for drug or venom allergies

Common allergy tests (cont.)

- Blood test (Specific IgE (sIgE) Blood Testing): allergen is added to a blood sample from the patient, and then antibodies produced are measured
 - Typically used if you have a skin condition or are taking medications that interfere with skin tests
- Patch test: allergen is placed on skin and covered with a patch/bandage, and checked after 48 to 96 hours
 - Usually used to diagnose *allergic contact dermatitis*: caused by direct contact to allergen

05

First Aid



Anaphylaxis

- Anaphylaxis: a life threatening allergic reaction
- Signs and symptoms of anaphylaxis:
 - Skin: hives, swelling, itching, flushed, cyanotic (blueish skin), etc.
 - Abdominal pain
 - Difficulty breathing, wheezing, rapid breathing, etc.
 - Rapid heart beat (pulse)

Epipens

- What is an epipen?
 - It injects a specific dose of epinephrine
 - *Epinephrine*: A sympathomimetic. It stimulates the nervous system
 - Constricts blood vessels - will raise blood pressure (in anaphylactic shock, blood pressure drops)
 - Dilates bronchioles - Makes it easier to breathe
- When to use an epipen?
 - Severe allergic reaction or anaphylaxis
 - Signs of an allergic reaction (such as signs related to the skin)
 - Along with compromised respiratory system (like difficulty breathing), airway swelling, or compromised cardiovascular system (ex. Weak pulse)

How to use an EpiPen

- Dose - 0.15mg for children under 4, 0.3mg for everyone else
- Steps (there should be more specific directions on the epi pen)
 - Remove cap
 - Blue to the sky, orange to the thigh
 - (stick the orange part of the epiPen into the thigh, make sure to not put your thumb on the end)
 - Hold (read directions for how long)



6

Significance and Development of Allergies

Allergic Reactions and the Immune Response:

When you eat something or come into contact with something your body thinks is bad, like peanuts or cat hair, your immune system goes into action. It thinks these things are like sneaky villains.

1

Invasion

Your immune system sends out special superheroes called antibodies to fight the invaders. These antibodies are like little fighters that lock onto the bad guys

2

Alert

The antibodies release special weapons called histamines. They make your body react by doing things like making your eyes water, your nose run, or your skin itch.

3

Save



Allergies Infographics

Mercury

It is the closest planet to the Sun and the smallest one in the Solar System

Venus

Venus has a beautiful name, but is also hot, even hotter than Mercury!

Saturn

Saturn is a gas giant composed mostly of hydrogen and helium

Mars

Despite being red, Mars is a very cold place full of iron oxide dust

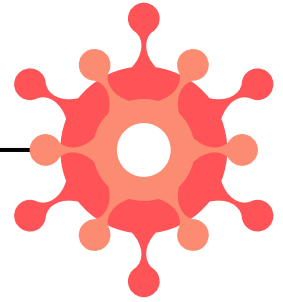


Allergies Infographics

The is the third planet from the Sun and the one that harbors life. It's between Mars and Jupiter

Earth

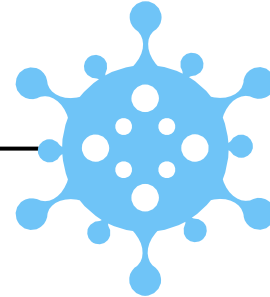
01



Venus has a beautiful name and high temperatures. It is hotter than the other planets!

Venus

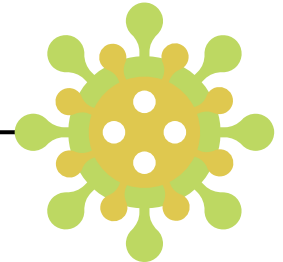
02



Despite being red, Mars is a very cold place. Iron oxide dust is the cause of the red cast

Mars

03



Allergies Infographics

1

Jupiter

It's a gas giant and also the biggest planet

4

Neptune

It's the farthest planet and the fourth-largest

5

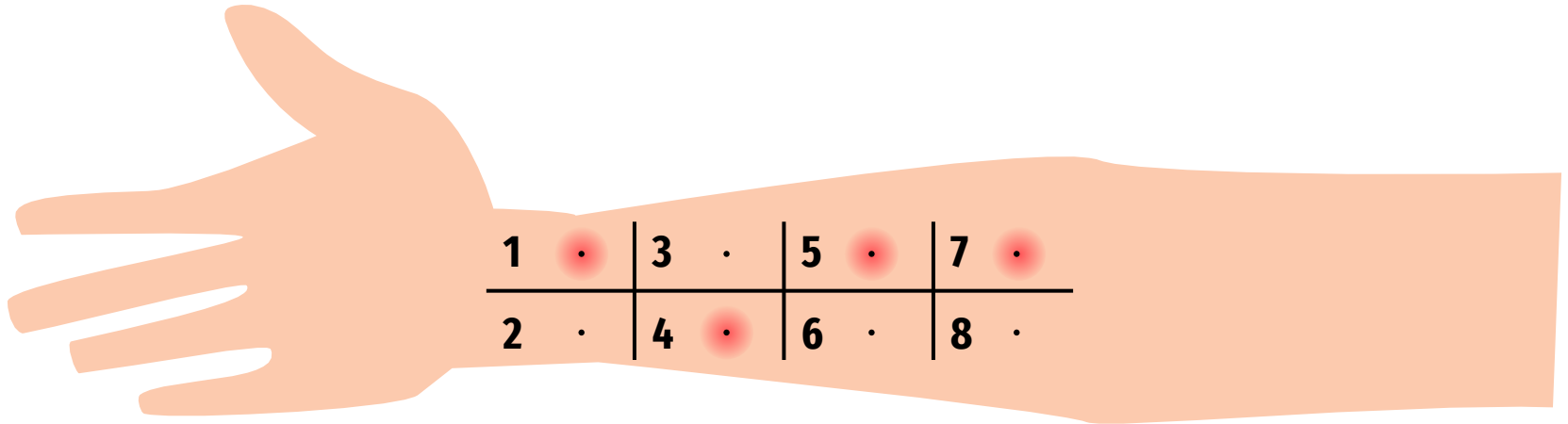
Mercury

It's the closest planet and the smallest one

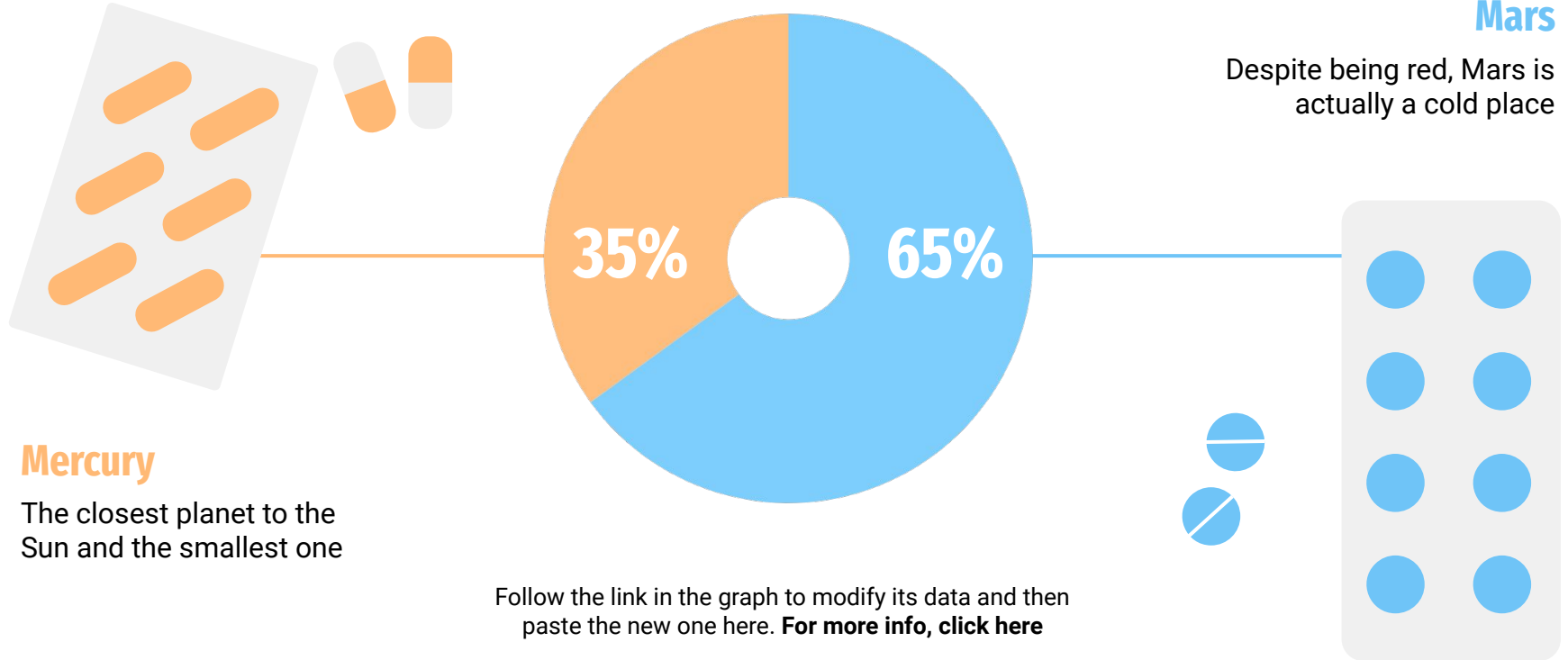
7

Mars

It's a very cold place. The planet is full of dust



Allergies Infographics

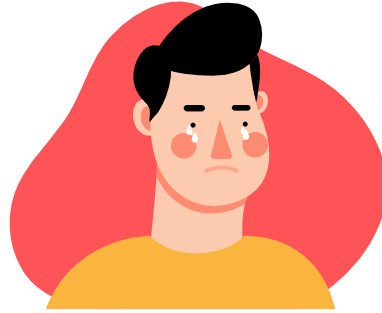


Allergies Infographics



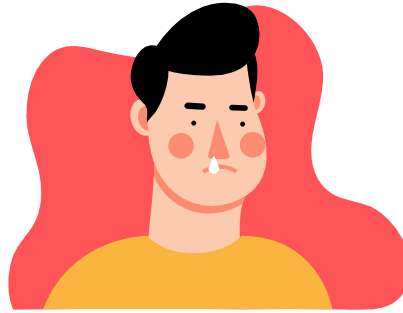
Jupiter

It's the biggest planet
in the Solar System



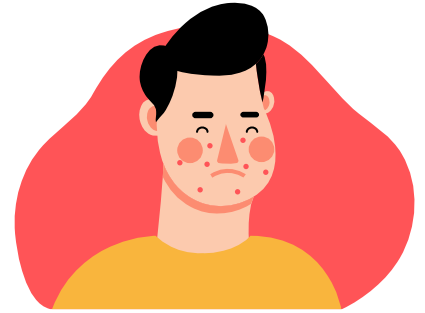
Saturn

It's composed of
hydrogen and helium



Earth

Earth is the planet
where we all live on



Venus

Venus is the second
planet from the Sun

Allergies Infographics



1 in 4
Children in the US

Have seasonal allergies, eczema, or food allergies (2021).



1 in 3
Adults in the US

Have seasonal allergies, eczema, or food allergies (2021).



25%
Saturn

It's composed mostly of hydrogen and helium



90%
Mars

Despite being red, Mars is actually a cold place

Allergies Infographics

Saturn

It's composed mostly of hydrogen and helium

Earth

The Earth is the planet where we all live on

Mercury

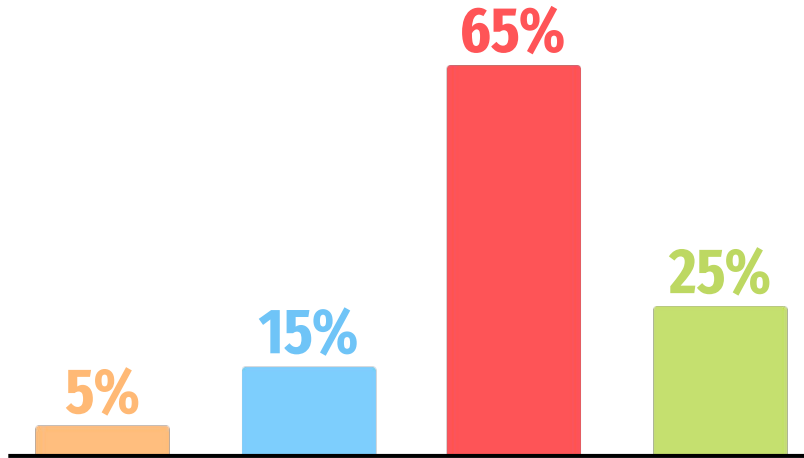
The closest planet to the Sun and the smallest one

Venus

Venus is the second planet from the Sun



Allergies Infographics



Follow the link in the graph to modify its data and then paste the new one here. **For more info, click here**



Autumn

Saturn is composed mostly of hydrogen and helium



Spring

Jupiter is also the fifth planet and the biggest one in the Solar System



Winter

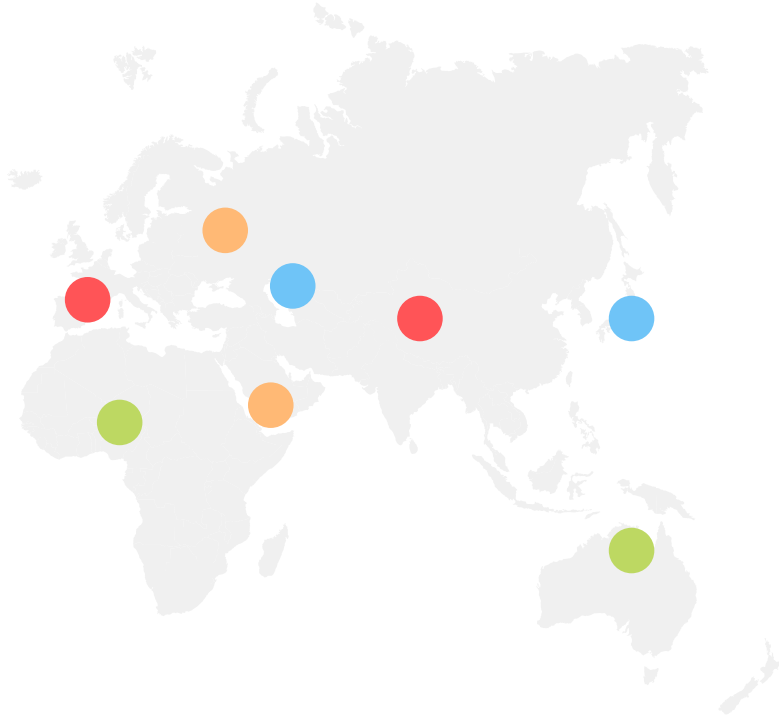
Despite being red, Mars is a very cold place full of iron oxide dust



Summer

The Earth is the third planet from the Sun and the one that harbors life.

Allergies Infographics



Venus

Venus has a beautiful name and is the second one from the Sun



Mercury

Mercury is the closest planet to the Sun and the smallest one



Mars

Despite being red, Mars is a cold place full of iron oxide dust



Jupiter

Jupiter is a gas giant and the biggest one in the Solar System



Allergies Infographics



Jupiter

Jupiter is the biggest planet of them all



Mars

Despite being red, Mars is a very cold place



Saturn

Saturn is a gas giant and has several rings



Neptune

Neptune is the farthest planet from the Sun



Mercury

Mercury is the closest planet to the Sun

Allergies Infographics

Mercury

The closest planet to the Sun and the smallest one

Venus

It's the second planet from the Sun

Saturn

It's composed mostly of hydrogen and helium

Mars

Despite being red, Mars is actually a cold place

Jupiter

It's the biggest planet in the Solar System

Earth

It's the planet where we all live on



Allergies Infographics

Venus

Venus is the second planet from the Sun and has a beautiful name

Neptune

It is the eighth and farthest-known solar planet from the Sun

Mars

Mars is the fourth planet from the Sun and it's also a cold place

Jupiter

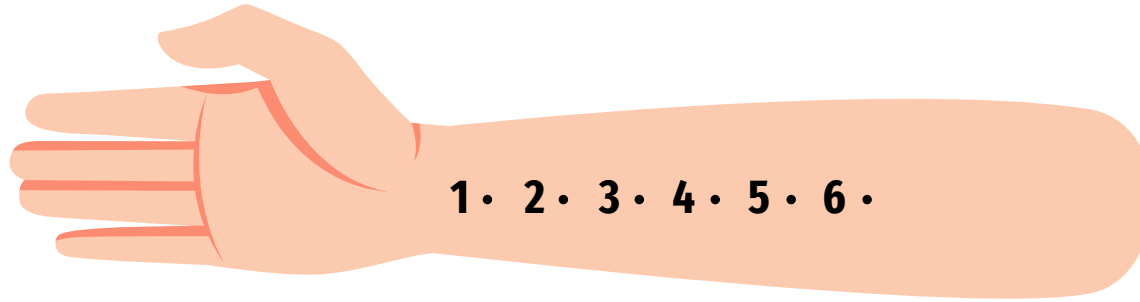
It's the fifth planet from the Sun and the largest in the Solar System

Saturn

It's a gas giant with an average radius of nine times the one of the Earth



Allergies Infographics



1	2	3	4	5	6
Mars	Neptune	Mercury	Venus	Jupiter	Saturn
Despite being red, Mars is a cold place	Neptune is the farthest planet from the Sun	Mercury is the smallest planet of them all	Venus is the second planet from the Sun	Jupiter is the fifth planet and the biggest one	Saturn is a gas giant and has several rings

Allergies Infographics

RASH

Saturn

Saturn is composed mostly of hydrogen and helium gas

Mars

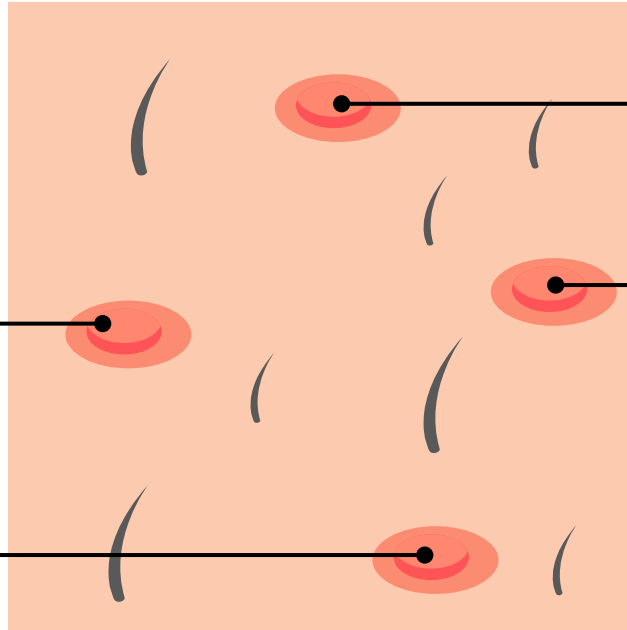
Despite being red, Mars is also a very cold place full of iron oxide dust

Jupiter

Jupiter is also the fifth planet and the biggest one in the Solar System

Earth

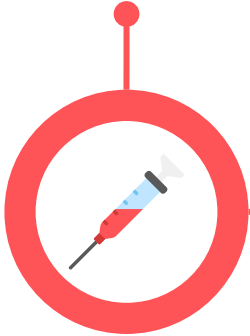
The Earth is the third planet from the Sun and the one that harbors life.



Allergies Infographics

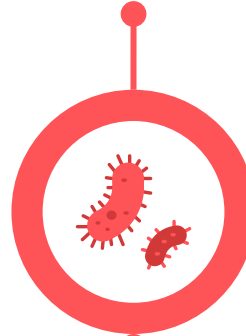
Mercury

The closest to the Sun
and the smallest one



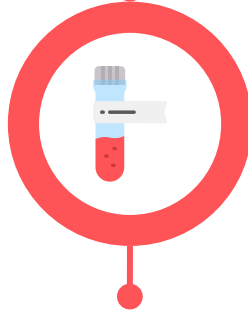
Earth

Planet Earth is the planet
where we live on



Mars

Despite being red, Mars is
actually a cold place



Saturn

It's composed mostly of
hydrogen and helium



Allergies Infographics

Jupiter

Jupiter is also the fifth planet and the biggest one in the Solar System

Saturn

However, Saturn is composed mostly of hydrogen and of helium



Mars

Despite being red, Mars is a very cold place full of iron oxide dust



Venus

Venus has a beautiful name and also has very high temperatures



Earth

The Earth is the third planet from the Sun and the one that harbors life.



Mercury

It is the closest planet to the Sun and the smallest one in the Solar System



Allergies Infographics

Mercury

It is the closest planet to the Sun and the smallest one in the Solar System

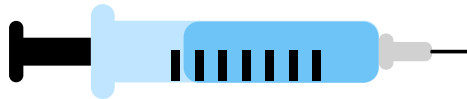
100%



Jupiter

Jupiter is the fifth planet and also the biggest one in the Solar System

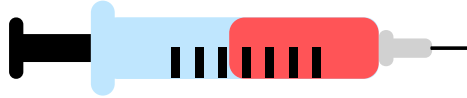
70%



Mars

Despite being red, Mars is a very cold place full iron oxide dust

55%



Earth

The Earth is the third planet from the Sun and the one that harbors life

85%



Allergies Infographics

Saturn

It's composed mostly of hydrogen and helium



Mercury

The closest planet to the Sun and the smallest one



Jupiter

It's the biggest planet in the entire Solar System



Mars

Despite being red, Mars is actually a very cold place



Earth

The Planet Earth is also the planet where we all live on



Allergies Infographics



Mercury

Mercury is the closest planet



Earth

Earth is the planet where we all live on



Jupiter

Jupiter is also the biggest planet



Venus

Venus is the second planet from the Sun



Saturn





Saturn is composed mostly of hydrogen



Mars

Despite being red, Mars is cold

Allergies Infographics

				
2017	1,3k	1,2k	1,9k	1,4k
2018	1,5k	2,5k	1,8k	3,7k
2019	2,0k	1,2k	1,5k	2,3k
2020	1,4k	2,4k	2,2k	3,4k

Allergies Infographics

Mercury

Mercury is the closest planet to the Sun and the smallest one

Venus

Venus has a beautiful name and also very high temperatures

Saturn

Saturn is composed mostly of hydrogen and helium

Mars

Despite being red, Mars is a very cold place full of iron oxide dust



Allergies Infographics



10%

Earth

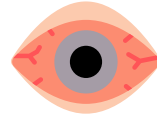
The Earth is the only planet that harbors life



60%

Neptune

Neptune is the farthest planet from the Sun



75%

Saturn

It's composed of hydrogen and helium



40%

Mars

Despite being red, Mars is a cold place



25%

Mercury

Mercury is the closest object to the Sun

Allergies Infographics



Venus

Venus is the second planet from the Sun



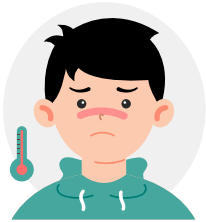
Earth

Planet Earth is the planet where we all live on



Mercury

The closest planet to the Sun and the smallest one



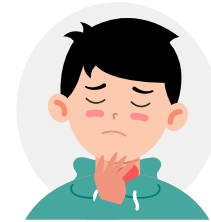
Jupiter

It's the biggest planet in the Solar System



Mars

Despite being red, Mars is actually a cold place



Saturn

It's composed mostly of hydrogen and helium

Allergies Infographics

Jupiter

Jupiter is a gas giant and the biggest object in the Solar System

Saturn

Saturn is composed mostly of hydrogen and also of helium



Mars

Despite being red, planet Mars is also a very cold place

Mercury

Mercury is the closest planet to the Sun and the smallest one

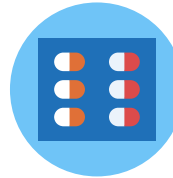
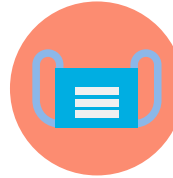
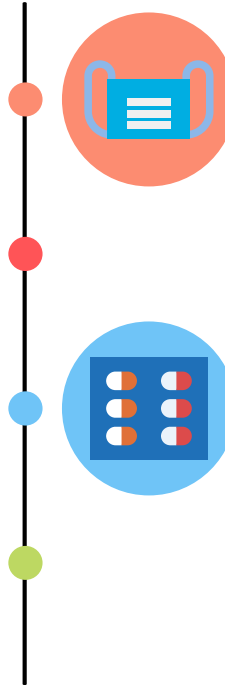
Allergies Infographics

Mercury

It's the fifth planet from the sun and the largest in the Solar System

Saturn

Saturn is composed mostly of hydrogen and also of helium



Venus

Venus has a beautiful name and it also has a very high temperatures

Mars

Despite being red, Mars is a very cold place full of iron oxide dust

Allergies Infographics



Earth

Venus has a beautiful name and very high temperatures. It is also hotter than the rest

Venus

Venus has a beautiful name and very high temperatures. It is also hotter than the rest

Jupiter

Jupiter is also the fifth planet and the biggest one in the Solar System

Saturn

However, Saturn is composed mostly of hydrogen and also of helium

Allergies Infographics

Mercury

Mercury is the closest planet to the Sun and also the smallest



Venus

Venus has a beautiful name and is the second planet



Mars

Despite being red, Mars is actually a very cold place



Jupiter

Jupiter is a gas giant and the biggest planet of them all



Saturn

Saturn is mainly composed of hydrogen and helium gas

