MICROBE

PATHOGEN

Clostridium botulinum (botulism)

When this species is in play you cannot play any food cards.

This microbe is responsible for botulism, a kind of food poisoning

T A -2

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T A -2

MICROBE

PATHOGEN

Clostridium dificile

When this species is in play you cannot play any BENEFICIAL microbes, except using "Probiotics."

An increasing problem in hospitals

T K -2

MICROBE

PATHOGEN

Clostridium dificile

When this species is in play you cannot play any BENEFICIAL microbes, except using "Probiotics."

An increasing problem in hospitals

T K -2

MICROBE

PATHOGEN

Yersinia pestis (plague)

This is the microbe responsible for bubonic plague ("Black Death")

K -2

MICROBE

PATHOGEN

Yersinia pestis (plague)

This is the microbe responsible for bubonic plague ("Black Death")

K -2

MICROBE

PATHOGEN

Salmonella enterica

A common source of food poisoning, often associated with poultry

A -2

MICROBE

PATHOGEN

Salmonella enterica

A common source of food poisoning, often associated with poultry

A -2

MICROBE

PATHOGEN

Mycobacterium leprae (leprosy)

Once a significant problem, leprosy is now treatable with antibiotics

T

-2

MICROBE

PATHOGEN

Mycobacterium leprae (leprosy)

Once a significant problem, leprosy is now treatable with antibiotics

T

-2

MICROBE

OPPORTUNISTIC

Lactobacillus reuteri

Synthesizes vitamin B12 when in BENEFICIAL zone.

Humans are unable to synthesize vitamin B12 alone

+2

K
B1
B12

-1

MICROBE

OPPORTUNISTIC

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Humans are unable to synthesize vitamin B12 alone

+2

K
B1
B12

-1

MICROBE

OPPORTUNISTIC

Bifidobacterium longum

Synthesizes vitamin B1 (thiamine) when in BENEFICIAL zone.

Humans are unable to synthesize this vitamin alone

+2

K
B1
B12

-1

MICROBE

OPPORTUNISTIC

Bifidobacterium longum

Synthesizes vitamin B1 (thiamine) when in BENEFICIAL zone.

Humans are unable to synthesize this vitamin alone

+2

K
B1
B12

-1

MICROBE

OPPORTUNISTIC

Escherichia coli

Synthesizes vitamin K when in BENEFICIAL zone.

E. coli *is normally an important part of your gut microbiome*

+2

K
B1
B12

-1

MICROBE

OPPORTUNISTIC

Escherichia coli

Synthesizes vitamin K when in BENEFICIAL zone.

E. coli *is normally an important part of your gut microbiome*

+2

K
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MICROBE

OPPORTUNISTIC

Fusobacterium nucleatum

If less than 3 microbes in your **BENEFICIAL** zone at end of turn, becomes a **pathogen**.

Common in healthy humans, but extra abundant in some illnesses

+2 Returns to **BENEFICIAL** zone any turn you have 3+ microbes there. -1

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MICROBE

OPPORTUNISTIC

Lactobacillus rhamnosus

When in your **BENEFICIAL** zone you can digest lactose and grains.

While generally considered safe (even used in probiotics), L. rhamnosus *can also cause problems*

+1 MILK -2

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MICROBE

OPPORTUNISTIC

Prevotella melaninogenica

When in your **BENEFICIAL** zone you can digest grains and plants.

Lives in the mouth and can both help digest carbohydrates and lead to peridontal disease

+1 -2

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When in your **BENEFICIAL** zone you can digest grains and plants.

Lives in the mouth and can both help digest carbohydrates and lead to peridontal disease

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MICROBE

OPPORTUNISTIC

Treponema carateum

When in your **BENEFICIAL** zone you can digest plants and lactose.

Has been known to cause human disease, but members of this genus may also be important in digesting fiber

+1 MILK -2

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When in your BENEFICIAL zone you can digest plants and lactose.

Has been known to cause human disease, but members of this genus may also be important in digesting fiber

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MICROBE

BENEFICIAL

Micavibrio aeruginosavorus

During your turn you may sacrifice this microbe to destroy a microbe in your PATHOGEN zone.

Can kill other bacteria and is being studied as a potential therapy

+1

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MICROBE

BENEFICIAL

Lactobacillus acidophilus

When this species is in play you can digest lactose.

Common in dairy products and probiotics

+1 MILK

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MICROBE

BENEFICIAL

Rothia mucilaginosa

When this species is in play you can digest grains.

Can degrade gluten in the human mouth

+1

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MICROBE

BENEFICIAL

Bacteroides ovatus

When this species is in play you can digest plants.

Found in most people and can help digest dietary fiber

+1

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PREBIOTICS

This card allows you to play an additional microbe this turn.

Prebiotics are non-digestible compounds that stimulate microbial growth

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INFECTION

Fungal

If target player has 2 or less microbes in their BENEFICIAL zone they lose 2 health each checkup.

A healthy microbiome helps protect against fungal infections

Discard when: 3 or more microbes are in the BENEFICIAL zone -2

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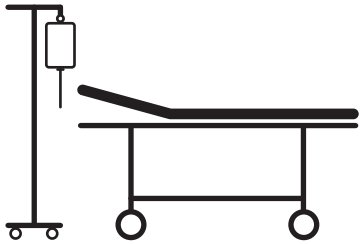
INFECTION

Nosocomial

Only playable on a player who has received antibiotics or a fecal transplant this game.

"Nosocomial infection" is the medical term for a hospital-acquired infection



Discard when: player gains health (not including during a Gut Check) -3

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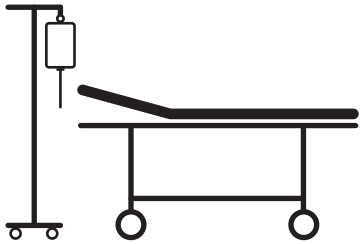


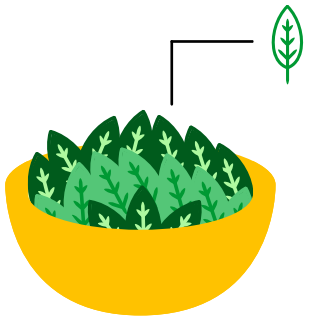
Discard when: player gains health (not including during a Gut Check) -3

EVENT
SALAD

If you have the ability to digest plants:

+1 **Gain 1 health immediately for each microbe with that ability.**

Feed those microbes…



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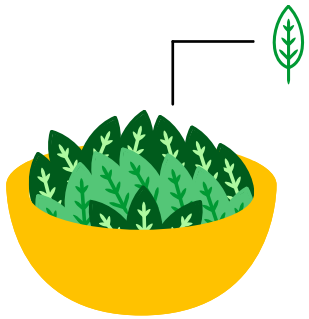

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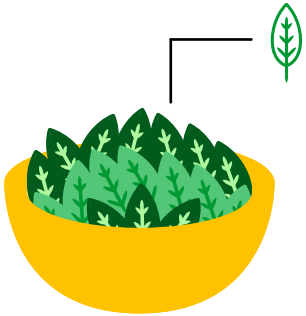
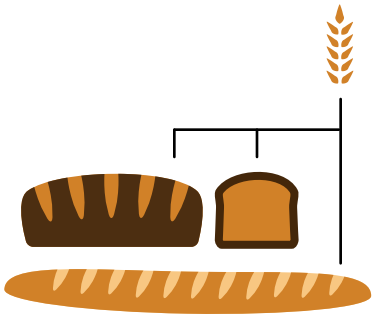


EVENT
BREAD

If you have the ability to digest grains:

+1 **Gain 1 health immediately for each microbe with that ability.**

Carbs!



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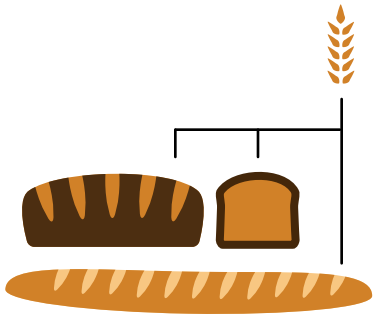

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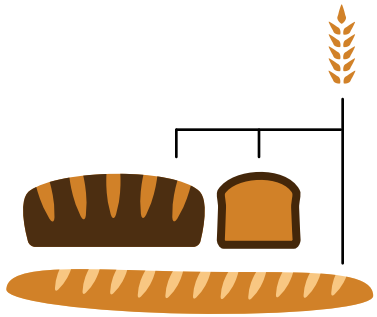


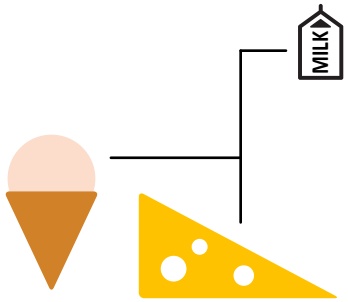
EVENT

MILK

If you have the ability to digest lactose:

+1 Gain 1 health immediately for each microbe with that ability.

Lactose intolerance is caused by the body ceasing production of the enzyme lactase



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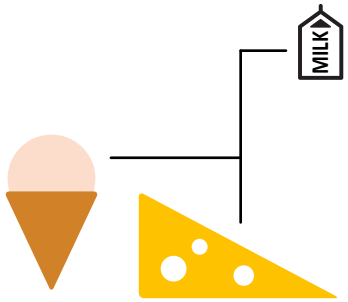

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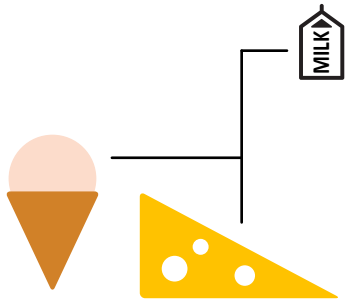


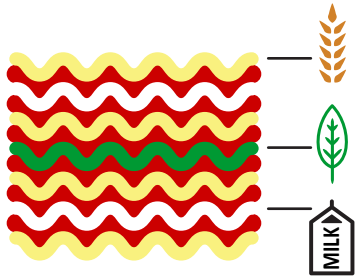
EVENT

LASAGNA

If you have the ability to digest plants, grains, and lactose:

+4 Gain 4 health immediately

Mmmmm…. Lasagna



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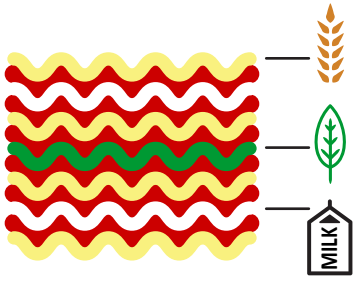
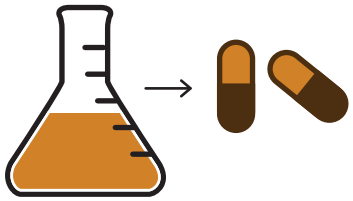


EVENT

FECAL TRANSPLANT

-3 This card removes all cards from your PATHOGEN zone (regardless of resistance), you lose 3 health.

A fecal transplant deposits material from a healthy donor into your gut



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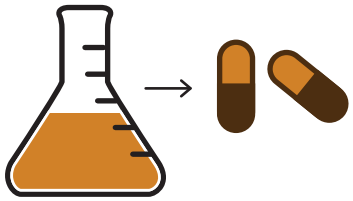


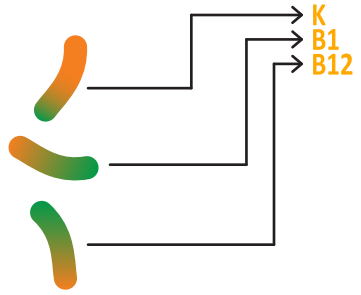
EVENT

VITAMINS

If you have the ability to synthesize vitamins:

+1 Gain 1 health immediately for each microbe with that ability.

Probably better in your gut than in a pill



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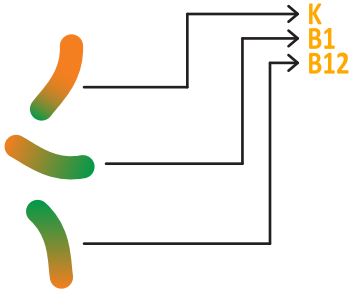

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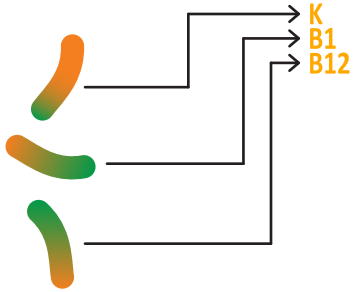
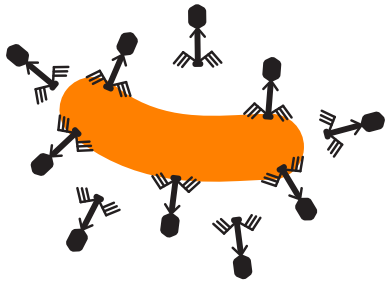


EVENT

BACTERIOPHAGE THERAPY

Destroy any one microbe in play.

Bacteriophages are viruses that attack only bacteria



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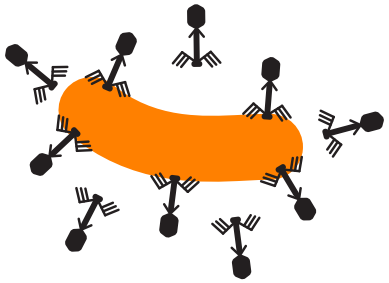


EVENT

HOMEOPATHY

Play this card for no effect whatsoever.

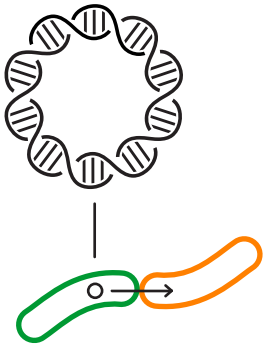
But hey, no side effects

EVENT

LATERAL GENE TRANSFER

Move any plasmid in play to another microbe within the same player.

Microbes love to share



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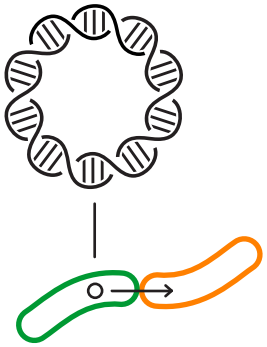

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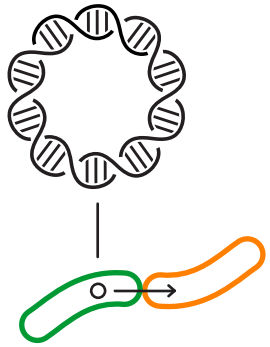
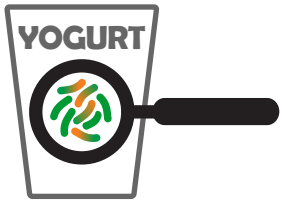


EVENT

PROBIOTICS

Draw cards from the deck and place the first non-pathogen microbe in your BENEFICIAL zone. Reshuffle deck afterwards. Does not count as playing a microbe this turn.

Probiotics are microbes found in foods such as yogurt that have a putative health benefit when ingested



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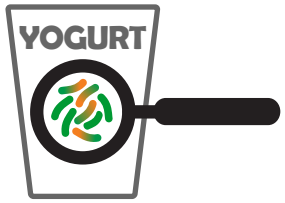
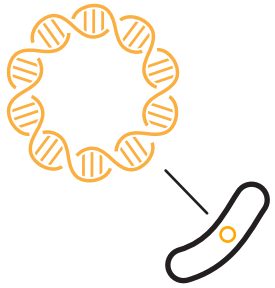


PLASMID

Gives any single microbe resistance to Tetracycline.

A plasmid is a small circular piece of DNA containing genetic information



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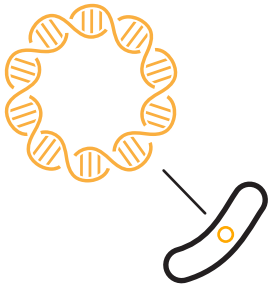

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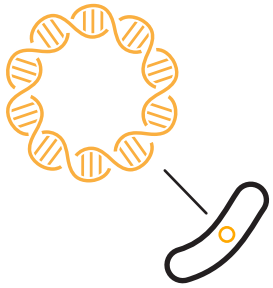

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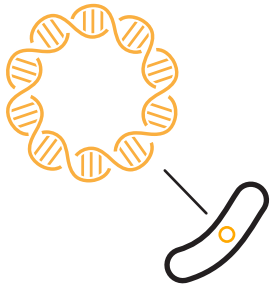

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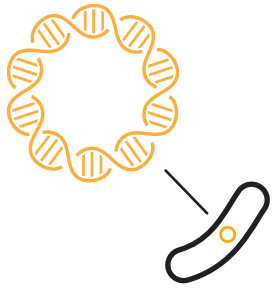

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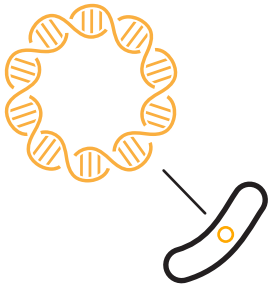

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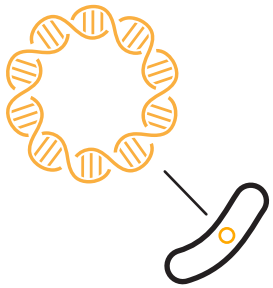

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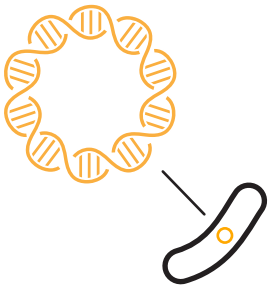

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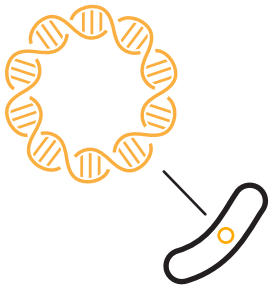

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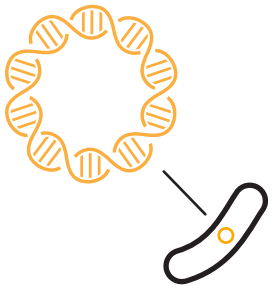

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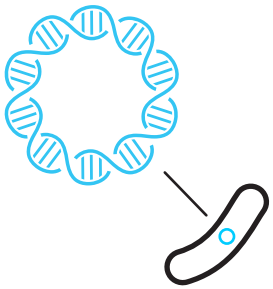

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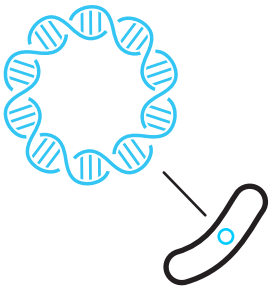

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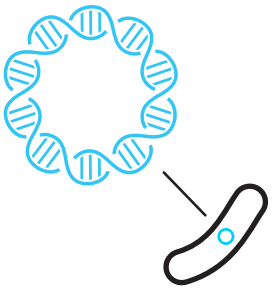

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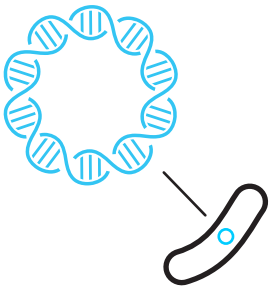

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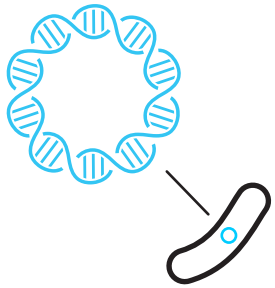

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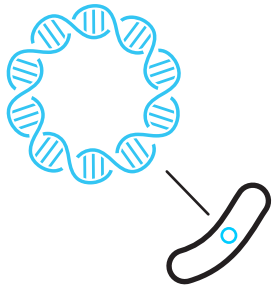

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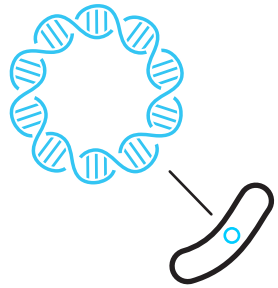

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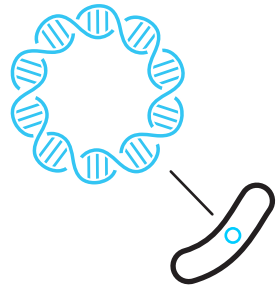

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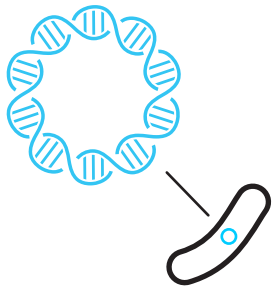

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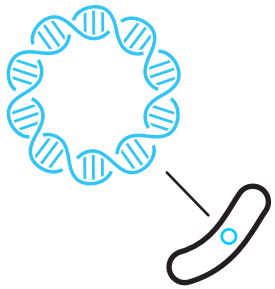

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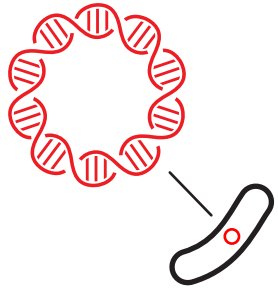

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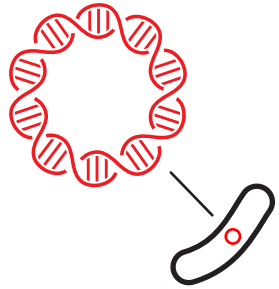

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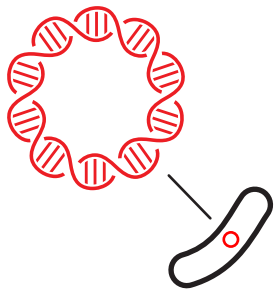

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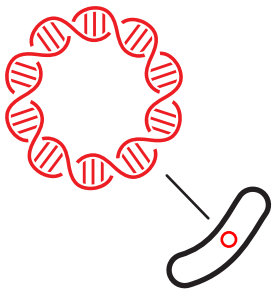

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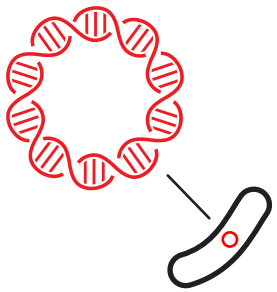

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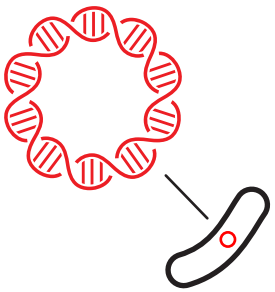

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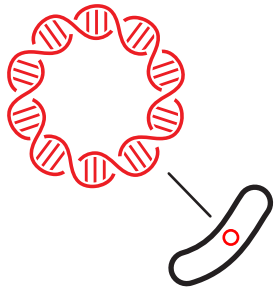

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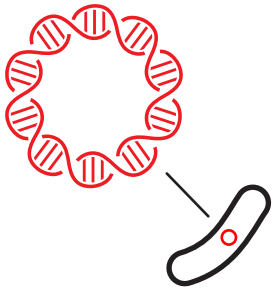

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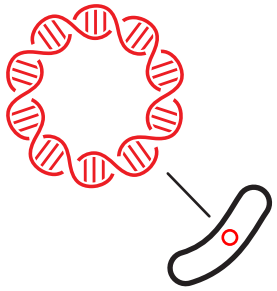

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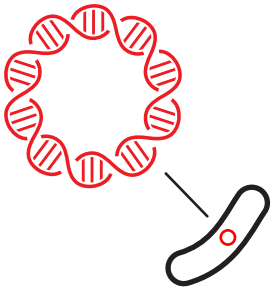

AMPICILLIN RESISTANCE

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CHANGE IN HEALTH

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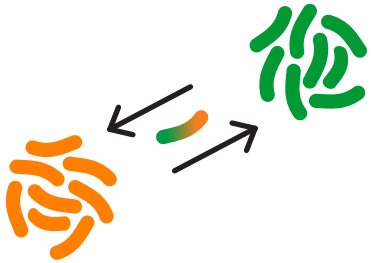
Changes in your health or the composition of your microbiome can cause some species to run amok



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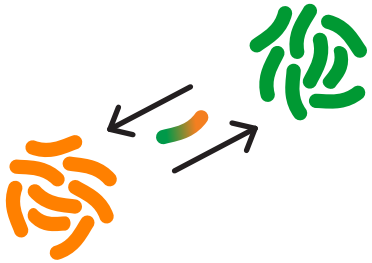

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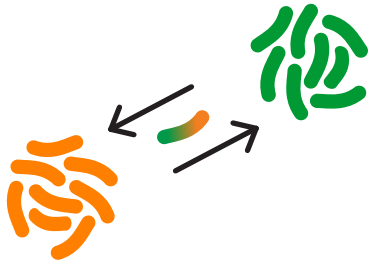

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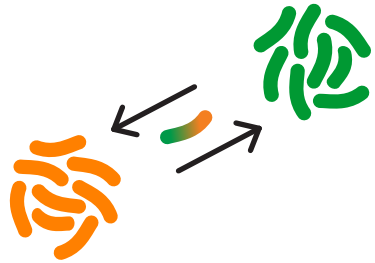

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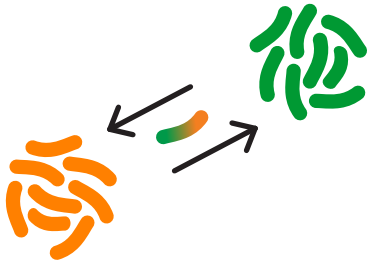

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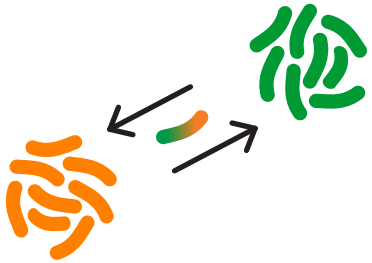

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ANTIBIOTIC

Tetracycline

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- **Must remove half of their non-resistant BENEFICIAL zone microbes (rounded down)**
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Once widely-used, resistance to tetracycline is now common

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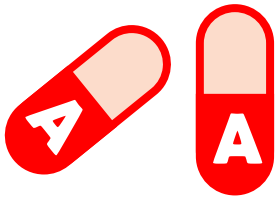

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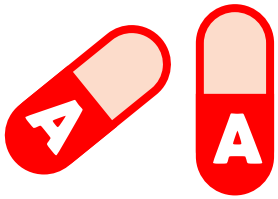

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If you have at least 4 microbes in your BENEFICIAL zone, remove a microbe from your PATHOGEN zone.

There appears to be a correlation between diversity of microbiota and health

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GO TO WORK SICK

-2 **Lose 2 health and give a microbe from your PATHOGEN zone to target player.** *Stay home!*

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AIRPLANE TRIP

Each player passes one microbe *in play* to the player on their left (if that microbe is opportunistic, it moves to the same type of zone on the target player).

Sharing is caring

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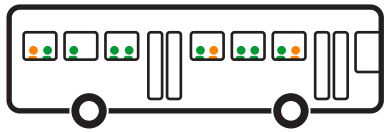

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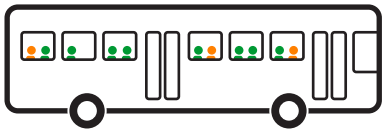

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RAID THE PHARMACY

Search the deck for any antibiotic of your choice (tetracycline, kanamycin, or ampicillin). Show to all players. Shuffle the deck afterwards.

We're not suggesting you do this…

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GUT CHECK

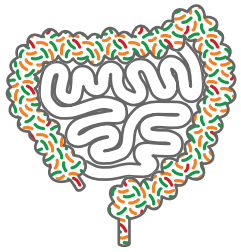
PLAY IMMEDIATELY

Every player scores their microbiome:

+ Postitive health for cards in their **BENEFICIAL** zone

- Negative health for cards in their **PATHOGEN** zone and **INFECTION** zone

The vast majority of gut microbes are found in the large intestine.



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Every player scores their microbiome:

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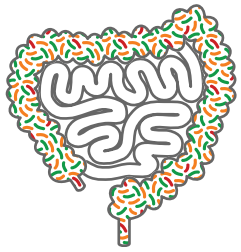

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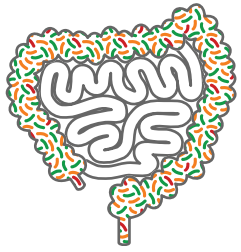

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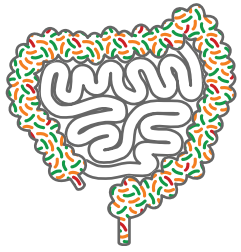

KEY

ANTIBIOTICS

~~A~~ *Ampicillin Resistance*

~~T~~ *Tetracycline Resistance*

~~K~~ *Kanamycin Resistance*

DIGESTION

Plants | Lactose | Grain | Vitamins (K, B1, B12)

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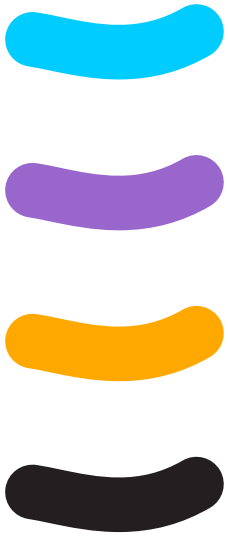
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