NU Not To Die From Botulism

what home canners need to know about the world's most deadly toxin

Hello, My Name Is: Clostridium Botulinum

Meet Clostridium Botulinum. He is a soil-borne, single-celled BACTERIUM. He likes Pina Coladas and getting caught in the rain. He hates oxygen. He, really, really can't stand the stuff.

In fact, if C. Botulinum senses oxygen showing up to the party, he builds himself an impenetrable armor shell and goes super-introvert, laying dormant until oxygen goes away. In this mode he's called a SPORE. He's really patient as a spore - he can wait **thousands** of years for conditions to improve and still remain viable.

If C. Botulinum finds himself back in a comfortable, low-acid, moist, oxygen-free environment, he'll "reanimate" back into his vegetative, bacterial form. In this form, he can grow, reproduce and, most significantly for the home canner, produce...

The BOTULINUM TOXIN, the most potent neurotoxin in the world and the cause of BOTULISM POISONING. This is what haunts the nightmares of home canners.

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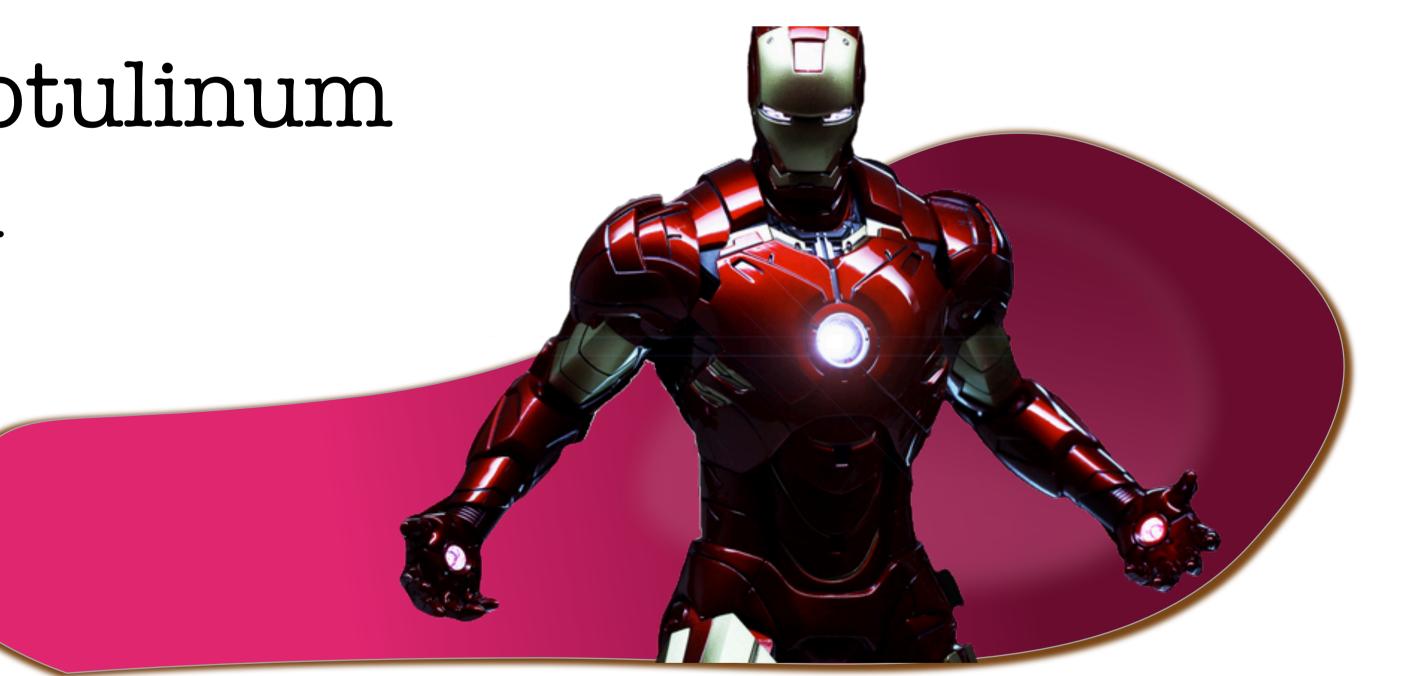
In Other Words...

If:

Vegetative C. Botulinum = Tony Stark



Then: Spore C. Botulinum = Iron Man



C. Botulinum Spores cannot be killed by boiling, drying, freezing, radiation or most household cleansers. They are wearing the Iron Man Spore Suit.

How Bad Is Botulism, Really?

Well, a pint jar filled with pure Botulinum Toxin would be enough to kill every man, uoman and child in the entire World.

Yeah, not even a Quart, just a Pint. It's that bad.

Sealing food in a jar, as we do when we water-bath can or pressure can food creates a moist, oxygen-free environment.

This is **exactly** the environment C. Botulinum spores are looking for to reanimate into their toxinproducing form.

Scared yet?

Then How Come We Aren't All Dead?

While Botulism posioning is deadly serious, it is thankfully very rare. Over about the last 50 years, the United States has averaged about 110 reported cases of Botulism poisioning per year. Of these, the majority are Infant Botulism. About 25% of cases are Food Borne - the kind home-canners are concerned with - and a few cases are Wound Botulism.

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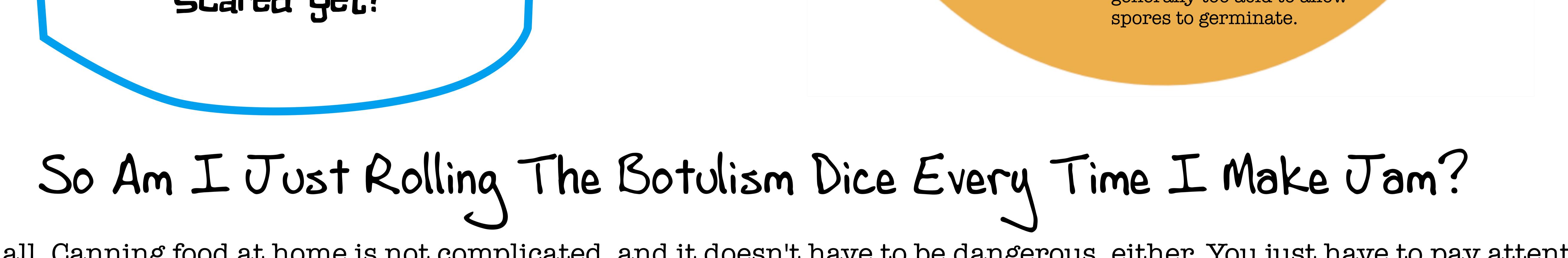
. . . Wound Botulism Occurs when Botulinum Spores or Bacterium are introduced into deep wounds, grow and produce toxin.

> OOD Bone 25°

Occurs when food contaminated with Botulism Toxin is ingested. The most common vector is homecanned low-acid food.

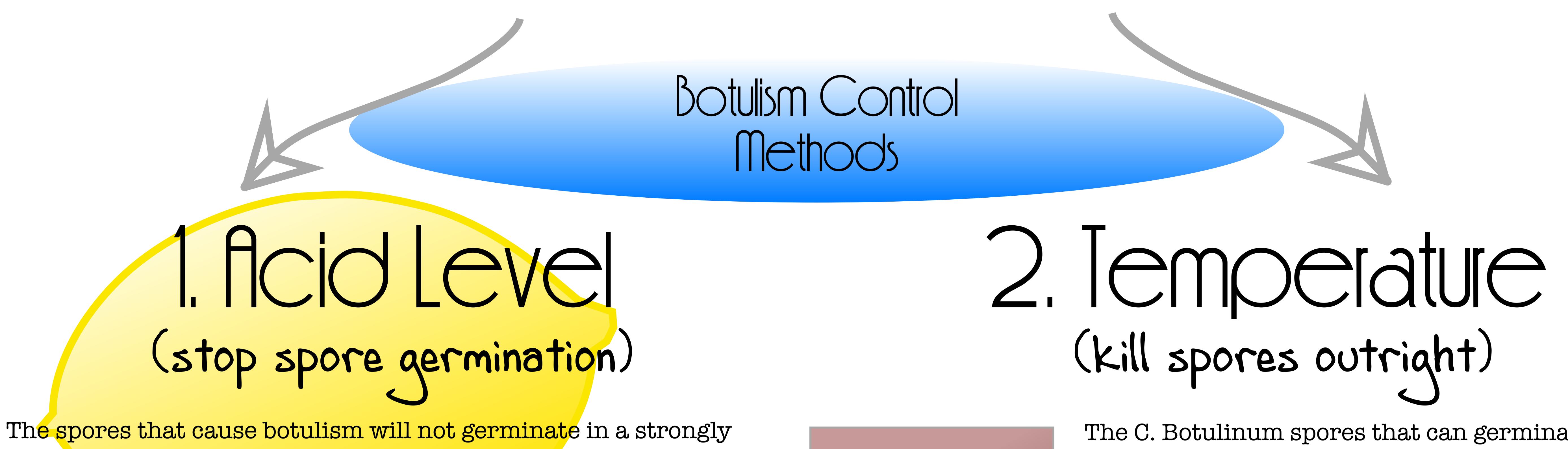
Infant Botulism

Occurs when Botulinum Spores laying dormant in soil or dust, on food or in honey colonize the low-acid digestive tract of an infant, germinate and begin to produce toxin. The digestive tract of people over age 1 is generally too acid to allow

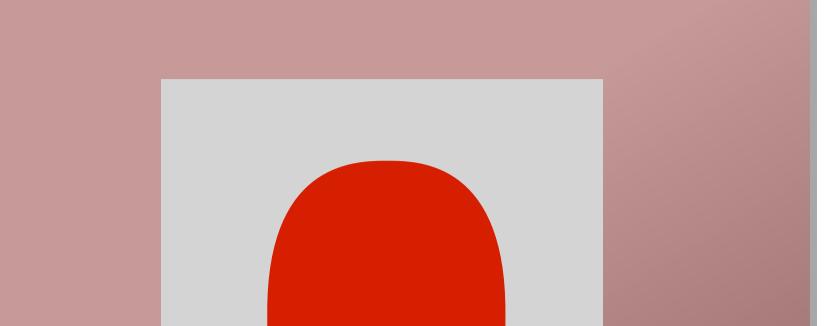


Not at all. Canning food at home is not complicated, and it doesn't have to be dangerous, either. You just have to pay attention to acidity and temperature and follow established food handling and processing standards.

The Home Canner has two options to ensure a botulism-free and safe-to-eat product. The first involves controlling the **acidity** of the product so C. Botulinum Spores never germinate, the second involves **heating** the product enough to kill the Spores themselves. Let's look at each of them in turn.



acid environment. If the spores never germinate, they cannot make the botulism toxin. Food that has a pH of 4.6 or less is considered strongly acid and is safe to can in a Water Bath Canner.



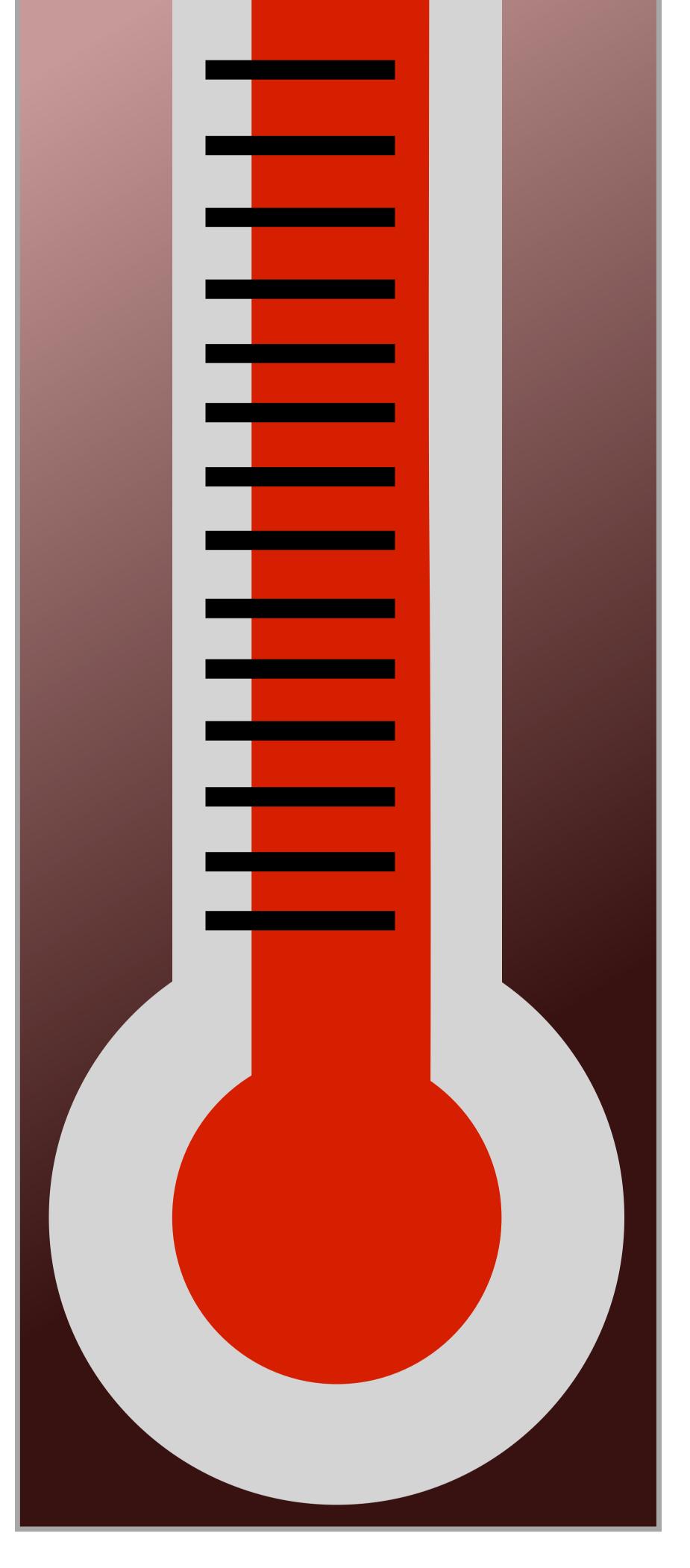
The C. Botulinum spores that can germinate and then create the Botulinum Toxin can survive temperatures of 212 degrees F/ 100 degrees C. This is why Water Bath Canning low-acid foods can create dangerous, Botulism-friendly environments.

Some foods are naturally high enough in acid to safely can in a Water Bath Canner. These include most fruits, which is why most jams, preserves, juices and fruits in syrup are safe to can in a Water Bath Canner.

Vegetables, meat, legumes and dairy naturally have a pH of 4.6 or above and are therefore **Low Acid**. These foods **CANNOT** be safely canned in a Water Bath Canner. Doing so would create the low acid, anaerobic environment which could allow the C. Botulinum Spores to germinate and produce the Botulism Toxin.

Low Acid foods can be made safe for Water Bath Canning if they are pickled (that is, made much more acidic) with the addition of strongly acid things like Vinegar, Lemon Juice, Citric Acid or (in the case of fermentation) Lactic Acid. This is how cucumbers - low acid and not safe to Water Bath Can - are turned into pickles - high acid and SAFE to Water Bath Can.

Because home canners do not generally have the equipment necessary to accurately determine the pH of their high-acid canned product, tested recipes should be followed.



However, even the spores give out eventually. If you get them up to 240 degree F/115 degrees C and keep them there long enough, the spores will die. In the USA, **commercial guidelines** for most canned low-acid food require a "botulism cook" at 250 degrees F/121 degrees C for three minutes, which reduces the chance of a C. Botulinum spore surviving to one in a trillion.

At home, temperatures above 212 F/100 C can ONLY be achieved in a pressure canner (not the same as a pressure cooker!). Because home canners cannot be absolutely sure how long it takes for every bit of the internal temperature of a jar of food to reach the necessary temperature, official guidelines for processing time when using a pressure canner must be followed. Never skimp on processing time, ever.

Happy Canning! Have fun, Eat Well and Stay Safe. NVEDIBLE.COM