Drugs and the Baby Brain

THE SCIENCE BEHIND BABY BRAINS

Presented by:

WPLab

[REFERENCE GUIDE]

We are aware that most physicians are unfortunately not aware of all of the evidence we have about the connection between acetaminophen and chemical injury to babies. However, WPLab, Inc. does not provide medical advice and does not recommend any particular method of treating fevers or pain during pregnancy or in babies or children. This resource is a free resource for parent education, and should not be used as a medical recommendation or take the place of medical advice.

How Drugs are Processed by Baby Brains

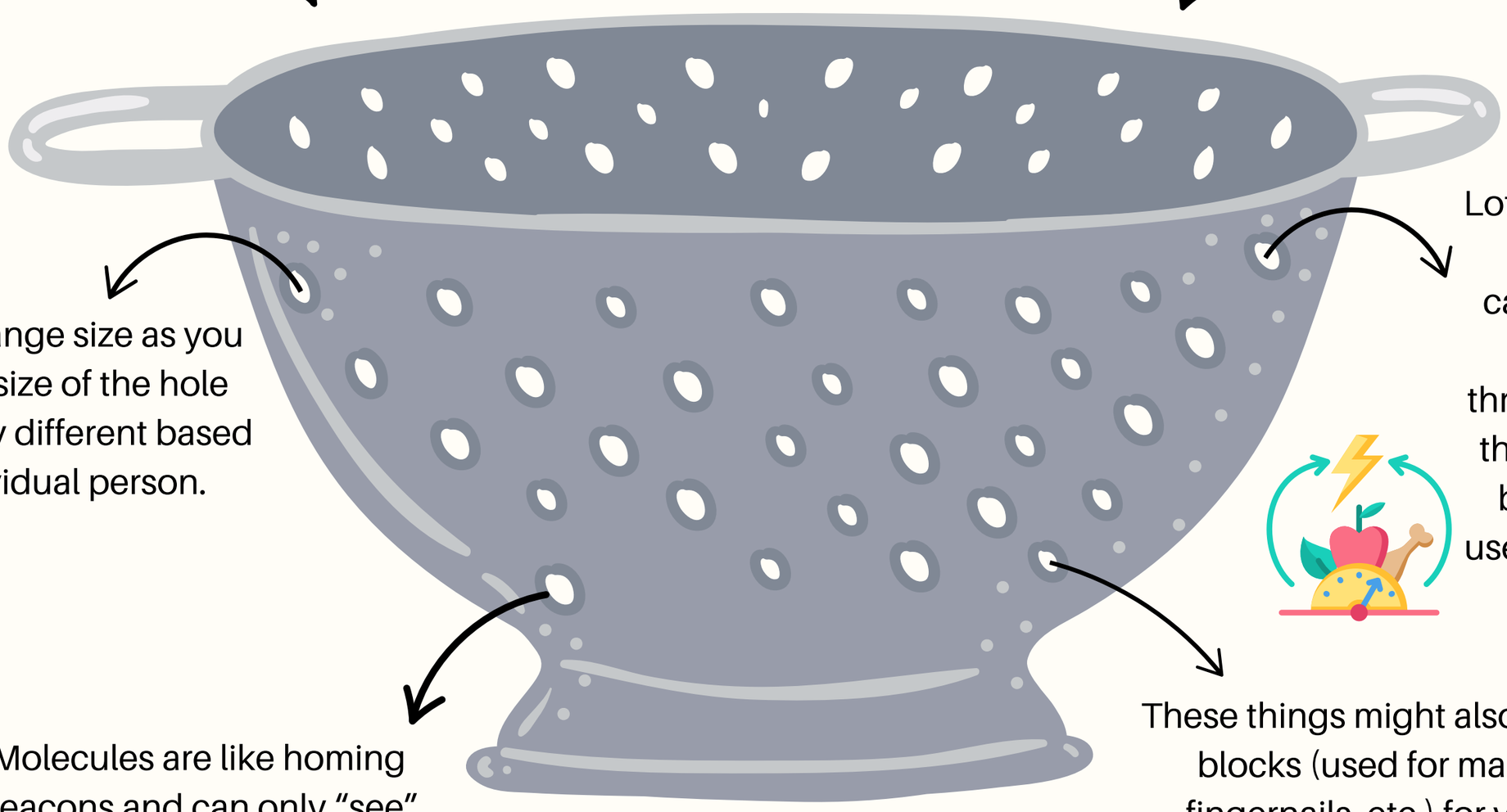
The body processes all of the chemicals that our body encounters each day through a process called metabolism. These chemicals include nutrients in our food, drugs, vitamins and even chemicals that are made by our own bacteria living in our gut.

Let’s talk about what happens in the process of metabolism and how it affects the baby brain.

Everything you consume, from broccoli to pesticide, immediately gets processed in this bowl.

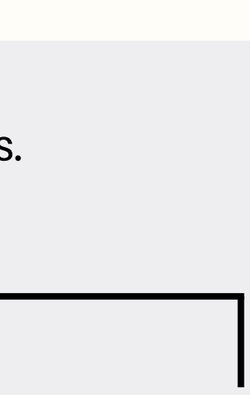
Metabolism is a process like a colander, or a big bowl with lots of different sized holes.

There are tons of holes in the bowl. They are all different sizes, and for different purposes.



Some holes change size as you grow, and the size of the hole itself can be very different based on each individual person.

Lots of things like proteins, carbohydrates, and fats go through a hole in the metabolism bowl and get used by the body for energy.



Molecules are like homing beacons and can only “see” the holes they’re supposed to go through (or could potentially go through).

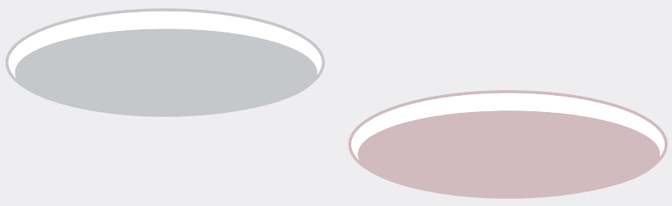
These things might also be building blocks (used for making hair, fingernails, etc.) for your body.

Generally, when something goes through a hole it is perfectly safe.

Now, there are two kinds of holes in the bowl that deal with drugs.

The holes that burn stuff or the holes that escort stuff out.

The first kind of hole is called “Phase 1” and burns the molecules that go into it.



The second kind of hole is called “Phase 2” and attaches a little buddy molecule that escorts it out of the body.

Both phases are helpful and normal.

This whole process is going on all over the body, including in the brain.

Most things we put through the bowl, including some drugs, don't become dangerous when they go through holes.

However, there are some exceptions.

We will use acetaminophen (commonly branded Tylenol in the U.S.) as an example, to better understand how processing drugs can affect a baby's brain.

Acetaminophen can go through three different holes for processing.

Hole #1 = Glucuronidation

This hole doesn't work very well in babies (or in cats) because it's so small. It's like it's not fully formed, and not much can get out. In adults, it's a main hole for acetaminophen to escape. This is a phase 2 hole (escort).

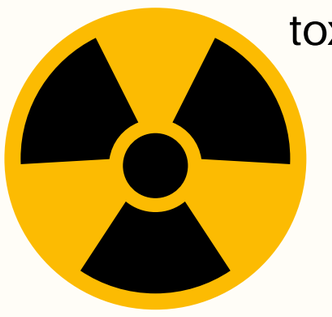
Hole #2 = Sulfation

This is the main hole in babies for acetaminophen to escape. Some people are born without this hole being very good (it may be smaller, or clogged, or not well formed). This is a phase 2 hole (escort).

Hole #3 = Oxidation

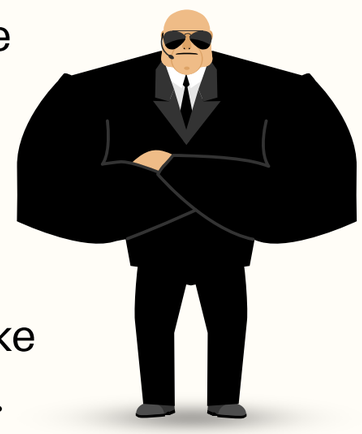
Everyone has this oxidation hole, even fetuses. This is a phase 1 hole (burn), which is an important distinction.

Acetaminophen is a weird thing when it's burned (aka oxidation). When it goes through this hole and is burned it becomes toxic, and that is potentially dangerous.



A similar process happens with alcohol, which also becomes toxic.

However, lucky for us, this hole has its own private security detail called glutathione. This sticks to the burned acetaminophen, and escorts it out, just like phase 2 does.



THE MAIN PROBLEM: IF the security detail gets depleted OR there's just too much acetaminophen going through hole #3, THEN the toxic burned acetaminophen is left hanging about.

Acetaminophen is mostly processed in the liver, but some in the brain, regardless of which hole is being used.

What happens then?
The leftover burned acetaminophen destroys anything in its vicinity.

Unfortunately, in babies and small children, if that occurs in the brain, a chemical injury occurs.

For learn more about how the babies brains are affected by acetaminophen, visit wplaboratory.org/resources

More about WPLab Inc.
WPLab is a not-for-profit company that conducts research and education related to immune system dysfunction in high-income countries. A current focus is the interaction between the immune system and acetaminophen (paracetamol) early in life, and how that interaction affects brain development. We are currently conducting laboratory work, and, at the same time, work with social media and other venues to educate caregivers about what is known regarding the impact of acetaminophen (paracetamol) on the developing brain. For more information about WPLab, please see our website at www.WPLaboratory.org.