Head butting species like goats, sheep, and muskoxen compete in high force headbutting fights.

Reasons for headbutting varies between bovids. Typically it's done to establish social order between males, but females participate too.

Defending territory is another big influence in butting matches,

especially against other goats

Another species that head butts for territory and dominance is the American football player!

These creatures equip protective helmets made of leather, foam, aluminum and a polycarbonate shell in place of horns.

A brain injury is the result of a brain rapidly moving back and forth, or side to side, into the walls of the skull because of an impact

No one can prevent the brain from moving inside the skull

Scientists are looking for innovative ways to prevent these kinds of injuries

But these helmets cannot provide complete immunity against brain injuries

Why is headbutting interesting?

There's a misconception that, unlike gummy human bodies, these horned bovids cannot get these traumatic brain injuries.

Enough brain injuries over time can damage the brain past its recovery point. In humans, this can commonly lead to chronic diseases such as dementia or CTE.

Chronic Traumatic Encephalopathy- a progressive degenerative disease.

They do it all the time! They must be fine"

But they're not-

Their brains will bounce around in their skulls just like ours do, but are much more vacuum packed in comparison to the human brain.

It can be easier to detect cognitive side effects in a human than a goat because You can ask them.

If it's confused?

If it has ringing in its ears?

Or is sleepier than normal?

Feels nauseated-

Dizzy-

Lack of Impulse control, and a rise in aggression.

Things like intense impairment of judgment

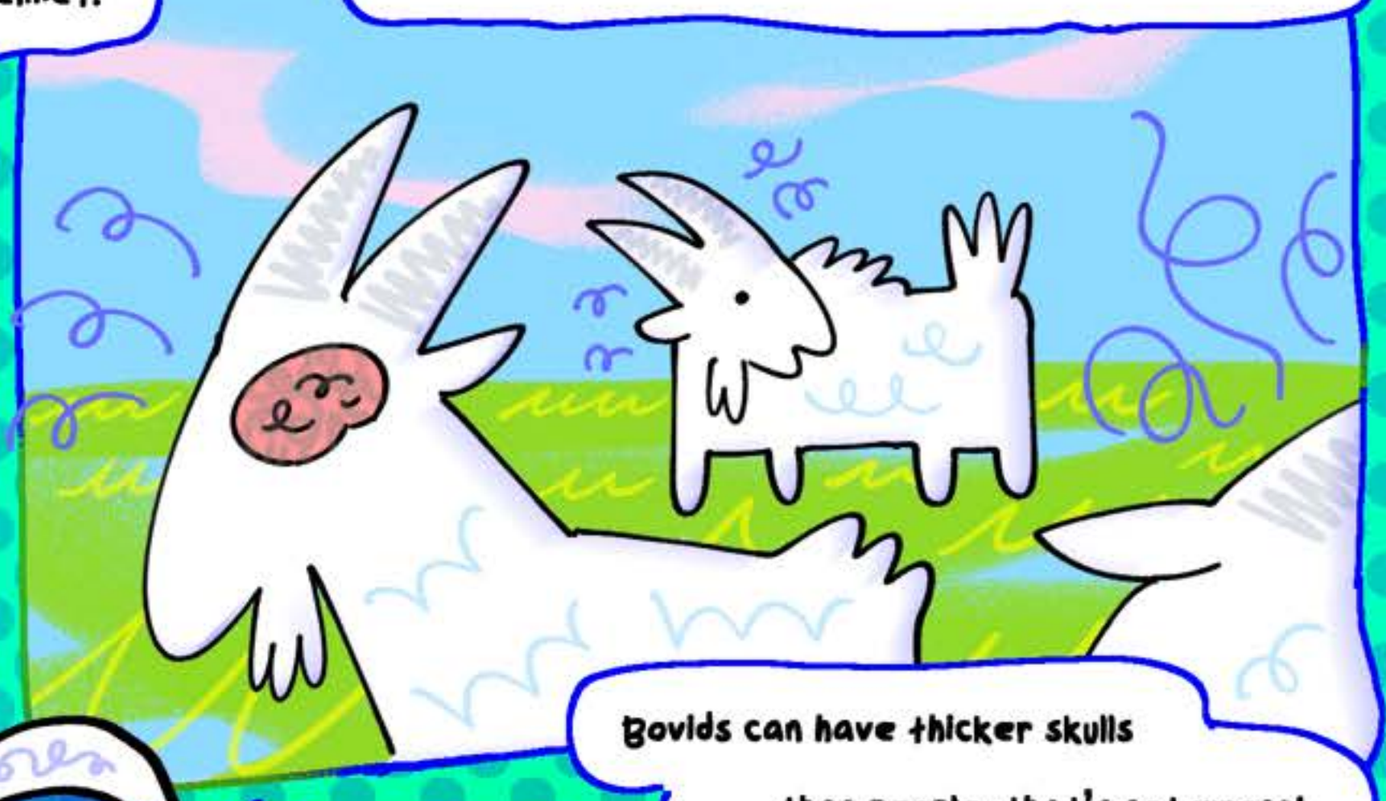
A big factor in the misconception that goats don't endure brain injuries from headbutting is their horns

"They use their horns to butt heads, it must take the brunt of the force!"

No, a goat's horns may be their fighting instrument, but it can't completely reduce the likelihood of brain cell death

"Then their skulls! They're so thick, it's like a natural helmet!"

But it's not a helmet, and we already know a helmet can't protect against 100% of brain injury



Bovids can have thicker skulls than people, that's not wrong!

DOMESTIC GOAT

1.3 cm

0.8 cm

HUMAN

1.5 cm

BIG HORN

0.7 cm

1 cm

0.8 cm

4 cm

2 cm

MUSKOX

But the thickness of a skull does NOT reduce the speed a bovid's brain will travel during a collision

So- why do they do this?

Why headbutt?

Why commit to a territorial and mating behavior that harms your brain?

Don't they know this could shorten their lives?

Well, they don't.

As long as they live long enough to pass on their genes and bring in the new herd.

they're all set.

The average lifespan of a goat is 16.5 years,

bighorns 9-14.

a Musk-ox 10-12.

Bovids' natural inclination to headbutt is a valuable opportunity for us humans to study brain injury and CTE. Their brains are also wrinkly like ours, which changes how damage accumulates.

This gives us a chance to understand what is happening in the brain after repeated injury

and how we could combat this.

Because in humans, the consequences of headbutting certainly outweigh the positives.

Lab mice can be useful for studying thr brain too,

But their brains are smooth- forces operate differently on a smooth brain compared to a folded brain.