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An interesting thing about carp is that they can go into anoxic hibernation and switch to an anaerobic metabolism based on converting glycogen to ethanol.

The waste ethanol is diffused out the gills

https://t.co/V3D1umHf04

Carp can switch over to an anaerobic metabolism and quietly exhale booze until the situation gets better.

They basically evolved the same metabolic pathway as yeast, independently.

In theory, if you spent a few thousand years breeding carp for it, you could use them to make booze.

They'd be enormous, almost entirely glycogen deposits with a fish added as an afterthought.

The really interesting thing about anaerobic carp, is that they can go 4-5 months without oxygen by relying on liver glycogen.

You, a human, have only about 100 grams of glycogen in your liver, about 400 more grams in your skeletal muscles. Call it 500 grams total.

In humans, glycogen is also burned for energy. This is where the marathon runner's bonk comes from: you only have about 2,000 calories worth, and running a marathon burns those 2,000 calories.

You have far, far too little glycogen in you to go anaerobic like the friendly carp.

Carp can be 12% glycogen by weight.

A 75kg human would need to have 9kg of glycogen to match their carp friend.

https://t.co/Bt29kS7pO5

Even if you did have 18x more glycogen than other humans, and the necessary pyruvate decarboxylase pathways to use it, you'd still have problems.

For one, that 9kg of glycogen would provide about 36,000 calories of anaerobic respiration.

Call it 18 days worth. You'd need a lot more if you wanted to beat your carp friend at holding your breaths.

For another, you'd *also* have to get rid of the lactic acid and ethanol.

You currently do this in the liver, by further metabolizing ethanol into acetaldehyde.

You do this completely differently depending on whether you're a fetus or not.

You'd not only need a vastly, vastly larger amount of glycogen, but a way of excreting the waste products more efficient than liver processing and the citric acid cycle and such.

In humans, of all ages, ethanol is itself metabolized into waste products like acetic acid and acetyl-CoA, this is the citric acid cycle. You already rely on this to survive.

https://t.co/gsnliVwr3G

However, to be more like a carp, this is simply not good enough. Far, far too much ethanol, far too few places it's metabolized.

You're gonna need a bigger liver or a better way

The simplest solution is to engineer a symbiotic relationship with acetic acid bacteria, perhaps reforming the liver into an enormous swollen mass of bacteria-riddled flesh.

But then you've got an acetic acid disposal problem.

You're gonna scare your carp friends by pissing vinegar at them.

The inelegant solution is that you're gonna need to be hooked up to a waterproof combined liver and kidney dialysis machine, to basically bypass both those organs with the power of modern technology.

So, there you are, with a 75kg mass of glycogen stores on an otherwise stick-thin fragile body, wearing a whirring dialysis machine hooked straight into you. At intervals it shits out vinegar pellets that drop down to the ocean floor below you.

Now you can hang out with a carp.