0:00:00.000,0:00:12.910

Why are cells so smal. I am made up about 35

billion cells. Why isn’t it 35 million? Over

0:00:12.910,0:00:18.980

evolutionary time cell,s haven't evolved

to become bigger there's something that

0:00:18.980,0:00:25.760

constrains their size and that something

is the process by which materials move

0:00:25.760,0:00:29.910

from the outside of cells into cells and

vice versa

0:00:29.910,0:00:37.489

and that process is diffusion. Now

diffusion is great because it's free.

0:00:37.489,0:00:44.200

It doesn't take any energy to move oxygen

from outside yourselves to inside

0:00:44.200,0:00:48.350

yours cells as long as there's more

outside than inside its going to move in

0:00:48.350,0:00:55.879

but there's a catch in the caches that

it only works if efficiently Lee enough over

0:00:55.879,0:01:04.989

very short distances. Let me explain in

your lungs if you have an infection like

0:01:04.989,0:01:11.380

pneumonia people can become very stressed

and even died from this and what's

0:01:11.380,0:01:16.740

happening is where the oxygen is

exchanging from the atmosphere into the

0:01:16.740,0:01:22.850

fluids of the body. Is that there's a

little bit extra fluid there and that

0:01:22.850,0:01:28.009

little bit of extra fluid means that the

oxygen has further to diffuse and takes

0:01:28.009,0:01:35.780

more time and that's what's causing the

stress on the body. Even though our cells

0:01:35.780,0:01:40.780

are really small they're not the

smallest cells. In the image you can see

0:01:40.780,0:01:47.290

a human cell and then you can see the

relative size of a bacterial cell. So our

0:01:47.290,0:01:55.100

cells are about a thousand times bigger

in volume than a bacterial cell so how

0:01:55.100,0:02:02.100

come ourselves can be bigger and the

answer is all the stuff they have inside

0:02:02.100,0:02:08.099

them. All these organelles make the

processes of life happen in localized

0:02:08.099,0:02:08.950

spaces.

0:02:08.950,0:02:13.060

much more efficiently where inside a

bacteria

0:02:13.060,0:02:19.260

they're simply relying on the diffusion

process to move molecules around no

0:02:19.260,0:02:25.680

specialized regions as such. And i hope

that clarifies how come cells are the

0:02:25.680,0:02:26.709

size that they are.