0:00:00.000,0:00:07.399

Eukaryotic cells the kind that humans

and animals have plants and fungi as

0:00:07.399,0:00:16.990

well are internally complex while you've

got thirty five billion of them so

0:00:16.990,0:00:24.650

they're not that big but inside they

have a lot of internal structure. That

0:00:24.650,0:00:31.820

starts with internal architectur. There

are elements called the cytoskeleton

0:00:31.820,0:00:40.230

that give the cell its shape but also

divide up the space inside and in some

0:00:40.230,0:00:47.390

sense provide almost like highways for

delivery of cell contents that have to

0:00:47.390,0:00:56.910

be processed in several of these

internal structures. I like to think of

0:00:56.910,0:01:01.890

it like building an office building.

0:01:01.890,0:01:08.200

You've got all this base but you have to

divide this space up to have any sort

0:01:08.200,0:01:12.840

of efficiency you've gotta have rooms

for specialized functions you gotta have

0:01:12.840,0:01:19.400

a copy room and washrooms and

lunch rooms and rooms in which the

0:01:19.400,0:01:27.869

power is generated in that's the same

inside each one of your cells. Now most

0:01:27.869,0:01:32.740

of these bits of internal structure

called organelles and they're surrounded

0:01:32.740,0:01:41.430

by a lipid membrane just like the cell

membran. And what that does is isolate it

0:01:41.430,0:01:46.329

from the rest of the cell just as the

cell membrane isolates the living

0:01:46.329,0:01:52.369

contents from the non living environment.

And what this means is that you can have

0:01:52.369,0:01:59.310

places where very specific things happen

and happen very efficiently. And in some

0:01:59.310,0:02:06.570

cases you need to isolate these contents

because otherwise they could harm the

0:02:06.570,0:02:08.270

cell.

0:02:08.270,0:02:14.280

So you have things like the Golgi

apparatus where you sort and package

0:02:14.280,0:02:21.150

materials made inside the cell. And you

have lysosomes where materials are

0:02:21.150,0:02:29.370

recycled so that monomers the bits of

bigger molecules can be reused. You have

0:02:29.370,0:02:37.820

the powerhouse of the cell like the

mitochondria. Let's take an example the

0:02:37.820,0:02:43.020

lysosome here's the recycling centre of

the cell so what happens is that as

0:02:43.020,0:02:51.510

molecules don't function anymore you can

deliver those to this enclosed organelles

0:02:51.510,0:02:57.980

and the bits are recycled it means that

inside there are enzymes that can break

0:02:57.980,0:03:06.420

down all the big molecules DNA and proteins

and carbohydrates and then those bits

0:03:06.420,0:03:11.790

can be exported and built into new

proteins but it's more complicated

0:03:11.790,0:03:16.690

interesting that each year I took my

students does anybody know anybody who

0:03:16.690,0:03:25.720

has webbing in the fingers or toes and

every year somebody knows somebody and

0:03:25.720,0:03:31.790

here's an example of how these

organelles are used. So in this case

0:03:31.790,0:03:36.870

everybody during development we're

involved creatures we had webbing as

0:03:36.870,0:03:41.459

part of our embryological development

but most of us are born with the webbing

0:03:41.459,0:03:47.010

gone and the means of removing those

cells of killing them is to send those

0:03:47.010,0:03:55.450

web cells a signal that says burst open

the lysosome. And by bursting it open all

0:03:55.450,0:04:01.350

these enzymes run amok and chomp

everything up and of course that means

0:04:01.350,0:04:09.060

the cell can’t survive so there's an

example of function. So inside the cells

0:04:09.060,0:04:14.200

you have architecture you have

specialized regions and you also have

0:04:14.200,0:04:21.230

within organelles a kind of folding of

membranes

0:04:21.230,0:04:27.070

And I like to think of this like the

coast of Norway. What happens is, is as

0:04:27.070,0:04:32.970

you fold the membrane you get a bigger

coastline a bigger surface area and you

0:04:32.970,0:04:40.520

can have processes that happen on that

membrane and by making it folded you

0:04:40.520,0:04:47.240

increase the surface area and hence the

efficiency of all these all these

0:04:47.240,0:04:54.740

processes that need to happen really

fast and to a great extent. So your cells

0:04:54.740,0:05:02.540

small as they are are enormously complex

inside. And I hope you understand now a

0:05:02.540,0:05:06.970

bit about why they have all these

different internal structures