

## Intro

0:03

Dr. Michael Roizen is next up. He is the chief wellness officer emeritus at Cleveland Clinic.

0:11

He's the founding chair of the Wellness Institute at Cleveland Clinic as well. He's also the author of four New York Times number one

0:18

bestsellers, including the book The Great Age Reboot. Please welcome Dr. Michael Roizen.

## Opportunity of a Lifetime

0:30

Thank you. I have I hope you guys are here for a long time because I have 3 hours worth of slides loaded.

0:36

And so we're going to go pretty fast. What I'm going to talk about is what I call

0:44

the opportunity of a lifetime, the chance that you will be able to be 40 again when your calendar strikes 90.

0:54

So I am always too early. In 1998, when we came out with Real age,

1:01

I said that 60 could be the new 40. You've heard Eric and Nir

1:07

talk about how that's really possible. I really believe that sometime in the next ten years

1:14

it will be very easy for you, in fact, to get to be 40 again.

1:22

That's with about an 80% probability as we'll go through.

## Why is this important

1:28

Why is that so important? Well, this is what's happening to the workforce in the United States.

1:35

Down at the bottom. They told us not to turn around, but I can't help it down on this mine.

1:40

You see the people who are, if you will, retired.

1:47

And on this slide you see the people who are working. You'll notice that when in 1950

1:55

there were 6.6 workers supporting each of us. I'm not retired, but each of the retired people now.

2:02

In fact, there are less than four. And over the next years that goes to 2.7.

2:09

In the United States, it can't happen, meaning 2.7 can't converge, can't support,

# The Human Genome Project

2:17

if you will, one person who's retired in the same style.

2:22

So we've got to get something that increases the workers to a longer age, and that's what longevity will do.

2:31

This started with the Human Genome Project when it started they expected to find

2:38

300,000 genes based on the amount of DNA in your nucleus.

2:43

They found only 22,500. All genes do, by the way, is make proteins or watch other genes.

2:53

So when you heard near talk about 5 or 10 thousand proteins, you actually have

2:58

genes that make around 20,000 proteins. And what was the rest of the DNA

3:06

it was initially called junk DNA by both of the investigators at the NIH and Craig Venter in private world.

3:17

And but seven years later, they found it was what we call

3:22

epi genes or switches that turn your genes on or off.

3:28

You have more switches than you do genes and you control those switches.

3:37

If you take nothing away from today. From what I'm saying is, remember, your actions matter because.

3:45

You control the switches that control your proteins.

3:51

And as you heard Eric speak,

3:57

93% in the most recent studies, twin studies

4:02

of which of your genes are on or not are under your control. So I'm going to keep repeating this slide.

4:10

Your genes make your proteins, and those proteins make you, and you control your genes.

4:17

That is why you can have such a strong do over, if you will.

4:23

You are the best genetic engineer for you that we know of.

4:30

As I said, 300,000 They expected to find. 22,500 they found.

4:38

The rest of it is stuff you control. Here's what stress management does. This is what's called the heat map.

4:45

So up and down our gene, they're the ones you take from the buccal,

4:50

Probably many of you have done Ancestry or me or one of those other gene programs. 23 and me.

4:56

You took a swab. This is what happens from the swab. You get a picture like this and this is 25 nurses, not

5:04

from the Cleveland Clinic where I'm from, but this is 25 nurses who hadn't gone through a stress management program.

5:11

They went through a stress management program between n1 and n2 This is 16 weeks later.

5:16

And M is a year later. Why is it called a heat map? Because where they're red, those genes are on.

5:24

So you see these genes are on they go through a stress management program and they largely turn them off.

5:29

What these genes up here producing, they're producing inflammatory proteins.

5:35

You get to turn off your proteins that cause

5:40

by just doing stress management. 256 different genes you turn on or off

5:47

these that are often get turned on, they decrease inflammation in your body.

5:52

Who does that? You do it by your actions. Here is one of the favorites studies from Dean Ornish.

## Dean Ornish Study

6:01

This is 52 guys with prostate cancer. And I don't know if you can see it, but these are largely red.

6:07

This is largely green, or off. They, over the years. So this is one-year difference.

6:13

Same 52 guys here, is on this side. They took these genes and turn them off.

6:18

What are these those are the RAS family of genes that promote the growth of breast, colon and prostate cancer.

6:24

Here, where they turned them, they were off and turned them on. These two produce the GSTM1 protein

6:31

that causes prostate, breast and colon cancers, to commit suicide. What did they do to do that?

6:37

The three guys who smoke quit smoking. all 52 eliminated five foods from their diet.

6:43

I'll get to what those are later. They did 15 minutes of walking a day, I'm sorry,

6:50

15 minutes of meditation a day, and they walk 10,000 steps a day. People accuse me of giving talks just so I can walk. (laughter)

7:00

This, This guy was at Hopkins and got turned down for coronary artery bypass surgery because.

7:08

This is the left anterior descending artery. This is the main artery, the left main artery.

7:14

And this is called rati coronary artery disease rati because It's throughout. And you'll notice he doesn't have much collaterals.

7:21

He came to the Cleveland Clinic saying, you're the best. I want coronary artery surgery. He got turned down at our place too.

7:28

But he got to see a guy named Cardwell Esselstyn who said,

7:33

all you have to do is change your diet, walk 10,000 steps a day, meditate 15 minutes, morning and night.

7:40

And if you smoke and he did quit smoking, the guy said, I can't walk five steps without, chest pain.

7:48

So Esse said, you get a new job, you're walking five, five steps, 2000 times a day. (laughter)

7:57

He did that and that's his same X-ray machine, same technique.

8:03

Two and a half years later, this is before statins, etc.. You get to control your genes.

8:09

It isn't just a change in food because I don't want high cholesterol.

8:16

No, your changing which of your genes are on or not and that changes you.

8:21

You are a genetic engineer for you. Why you stress a muscle and why is that good for a brain?

8:28

You guys are so lucky you've got a Aviv here. They not only do the hyperbaric, but they do everything else in that program.

8:36

And one of it is to stress muscles. You guys can do that too, as you've heard. But what happens when you stress the muscle?

8:44

You turn on a gene that makes the protein Irisin Irisin goes to your brain and turns on another gene called brain

8:52

derived neurotrophic growth factor, which is like miracle-gro for your brain. It increases your hippocampal size

9:00

and you have less problems with memory. So one of the keys

9:06

that Aviv stresses is in fact physical activity and that all of, you know, the lifestyle of TheVillages is perfect

9:14

for that. Another thing

# Longevity

9:19

I don't know why I've got this again. this one is you also stress your muscles.

9:27

It turns on another protein that makes GPLD-1 who cares about the name,

9:34

but that one makes your blood brain barrier much better.

9:40

So it stops inflammation from going to your brain and it gets rid of old proteins.

9:47

Why does the body do this? Who knows why it happened? How do we know it really did?

9:52

Because Harvard and M.I.T., UCSF tried to patent this, have a patent pending for this from the same day they're competing

10:01

because they think maybe one day we'll be able to give this protein to you.

10:07

In any case, the key point is your choices matter.

10:13

What you do matters to how long and well you live. You are genetic engineer for you.

10:19

Now, if you look at longevity, you heard from Nir that we were in the 20 range for millennia,

10:26

but starting in 1890 we've gone up two and a half years every ten years.

10:32

Women are always a higher life expectancy. They're blue here than men.

10:37

They live about three years longer and initially the increase of two and a half years per ten years was due to sanitation and things for kids.

10:47

Now it is the management of chronic disease such as high blood pressure and diabetes and valve diseases.

10:54

But we expect in the next. And by the way, before I go further on that, let me show you.

11:02

This is heart disease. And if you go back, if I can back, let's see. Yeah, sorry.

11:08

This is sorry. I'll get there. This is

11:14

the heart disease death rate from 1950 to 2019.

11:21

You'll notice it's decreasing. In fact, that's what the benefit of the blood

11:27

pressure pills and the statins and the other things are. If we had the same number of deaths

11:32

in 2019 or in 2023 as we had in 1950, we'd have 450,000 more deaths in the United States

11:42

and 55% reduction in heart disease because of the advances in science.

11:48

So when you reject statins, that's making a choice. That's making you older.

11:55

Let me repeat that. Don't believe everything you read on the Internet. Statins have made, and blood pressure pills have made a major benefit.

12:04

That's in every age group. The death rate has declined. Same thing with cancer.

12:10

If we had the same therapies for cancer last year as we did in

12:16

1992, we'd have 150,000 more deaths. We're advancing in medicine.

12:23

But you've got to help us. So that means, in fact,

12:28

we've continued to increase life expectancy of those population, ones that have done healthy choices.

12:37

That is, if you look at the course, at the pace where we have opioids and obesity.

12:43

But if you look at the coasts in America, we've still continued and the rest of the world has still continued to increase life expectancy.

12:51

But in the next ten years, we expect major jump, a 30 year jump.

12:58

So if you're 80 and expect to live to 90, you make it to 90.

13:03

Going to make it to 115.

## Exponential Change

13:09

I love doing that. I'm going to do that again. That's a exponential jump.

13:15

Now, Peter Diamandis says an exponential jump

13:21

is in fact, if you take one linear step

13:26

or you take 30 linear steps, you get 30 yards closer to the goal line, you take 30 exponential steps

13:34

one, two, four, eight, 16, 32. You're 26 times around the earth.

13:39

That's how fast science is progressing. I can ask it to you another question.

13:45

Anyone know what it costs to do the first human genome and from either niche or private world, you know

13:54

how much it costs. Take a guess. Is \$1 billion? Pretty damn good guess.

13:59

It actually costs \$2.7 billion. Okay. What does it cost now to do that amount of your genome?

14:08

It's go ahead. You know what it costs now? You know, it costs

14:14

\$100 regularly unless you get it on Mother's or Father's Day when Walmart has a special and it costs \$70, that's exponential.

14:24

How fast science, It's gone from 3.7 billion to \$70.

14:30

You can do your whole genome, which they didn't do in the Human Genome project for only \$800.

14:36

Now that's exponential change and that's what we're about to see, we believe.

14:42

So if you're 75 now, when you were born, you were expected to live 60.

14:48

You've already passed your sell by date. But in fact,

14:55

the clock would say you're going to live to 82. Wrong. You're going to probably live to 100, which means you got 25 more years left.

15:04

So you better get back to work. There are 14 hot areas of research

15:13

into what we call the mechanism of aging. Looking at why we age.

15:20

And in fact, one of them is Senolytics. Senolytics, you heard Aviv.

15:25

I'm here to talk about. In fact, it's the harvesting of old cells that make your neighbor old.

15:32

What happens? I'm picking on you. I'm sorry. What happens if you've got a piece of old rotten fruit?

15:37

A fruit bowl? What happens? The rest of the fruit, it gets rotten, right? You had a bunch of neighbors help you. That's a good policy.

15:44

In fact, that's what happens with your body. We have old cells now.

15:51

When do we first get old cells? When we're actually, You're right! It's before we're born. In utero, but our immune system gets rid of them

16:00

till about age 30. At age 30, we start not to have the immune system get rid of them.

16:06

But in fact, you can do a project where you donate blood this way.

16:11

It's called therapeutic plasma exchange. This lady donates her blood, she gets her red

16:18

cells back, washed, she the plasma gets thrown away. That's those old proteins.

16:25

It's the cells those proteins make that makes you old. We think. And you get fresh plasma.

16:31

And guess what happens? This is the study if you want to Google it. It's the AMBAR studies.

16:38

Guess what happens? All you have to do is look in this panel here, the red is the people

16:43

who got it. The black is the people who didn't. Going up is better. Cognitive functions. It's only thing we know that actually reverses Alzheimer's disease,

16:51

randomized controlled trials called AMBAR You can look it up Google, but that's getting rid of it.

16:59

We're at the early stage of it. You'd say, why don't we do it? Why isn't it now popular?

17:05

Because the company that sponsored it, which is the company that makes albumin, found out in this data analysis that saline did as well as albumin.

17:15

So they stopped doing the studies. So hopefully NIH will pick it up.

## Stem Cells

17:22

There are a whole bunch you've heard about autophagy gene editing. One of the things that hyperbaric what we call hormetic hyperbaric

17:32

oxygen therapy, which is what you find at the Aviv Clinic does. And by the way, I have no relationship with Aviv,

17:39

although I'm here speaking and they let me come here. I didn't accept being on their scientific advisory board

17:44

because I wanted to be able to tell it to you without any bias at all. This thing works, but there are other things.

17:52

Let me show you what telomeres are. Who's this lady?

17:58

That's Elizabeth Blackburn. She won the Nobel Prize for coming up with telomeres, rediscovering them

18:03

in 1994, and it's not showing. So I'll skip over that.

18:09

But in any case, what stem cells are is they're the matriarch of the body.

18:15

They produce everything. We learned that where they come from

18:21

is your spinal bones, if you will. The bones near your spine are the best for producing them. Now,

18:30

we learned why you get to a hospital fast after a heart attack or stroke.

18:37

It's not just to open up the blood flow to get marginal tissues back to normal.

18:43

That's what most of us thought until a few years. It's actually to open it up so that the exosomes in the cells

18:51

that are dying call forth your stem cells and you can rebuild.



18:57

We learned that when a male heart was transplanted into a female body and that male heart had a heart attack,

19:06

the ejection fraction, the amount of blood you inject after a heart attack goes down substantially.

19:11

It goes from about 65% down to about 30%. In a normal heart attack,

19:17

there is no normal heart attack in the usual heart attack. But guess what?

19:23

If you get to the hospital soon and you open up blood supply, your stem cells from your bone marrow, if you have them

19:30

and haven't wasted them, come to the heart. And then over a six week period they grow in the more heart cells

19:38

and you back to pumping at 65%. That's what we learned because when that heart

19:45

had the heart attack, it was the female person's stem cells.

19:50

You can tell that by looking at the chromosomes, it was the female person's stem cells that repaired it.

19:57

So the problem is most of us have a limit on stem cells.

20:02

Did you ever get sunburn when you were young? - Absolutely. - You wasted your g\*\*damn stem cells.

20:08

Because what happens is whenever you have an injury, you have stem cells run to it.

20:14

But we only get 70 to 110 stem cells out of each one of our native stem cells.

20:20

So we're wasting them, if you will, and we run out of them. Well, the Aviv process makes more, but

20:29

the telomere is something that gets shortened every time we have a duplicate action.

20:34

So you get shorter and shorter and shorter telomeres. Well, the great news is you can build them up.

20:40

Maybe. So this is a drug that may do the same thing.

20:47

This is the end, the telomeres, that end of your chromosome, and it gets lengthened.

20:52

And guess what? When it gets lengthened, I'm going to give you another example of it.

20:59

At Stanford, they took I think it was 18 people, right, 18 people who had a stroke and had no function

21:09

on one side of their body, meaning they couldn't move their arm or leg for six years or more.

21:16

So this is 18 people. They took some stem cells from them in their bone marrow,

21:22

used some drugs, grew them in culture, and then injected them into that area.

21:28

And seven of them now got total recovery.

21:34

That's you get to repair yourself and what does it is your stem cells.

21:40

So just imagine if you have it. You could have, and by the way, these are things that change your stem cells.

21:48

So stress shortens it. People regularly meditate longer, telomeres, people who regularly have friends have longer telomeres.

21:55

People who regulate sugar laden and processed food have shortened telomeres. People regularly eat healthy have longer telomeres.

22:03

People who regularly do extreme physical activity have shorter telomeres. Don't do a marathon. People regularly do moderate

22:09

physical activity, have longer telomeres. Walk that 10,000 steps. Astronauts have shorter telomeres.

22:15

People who have sun burns or smoke or vape have shorter telomeres. People have short sleep times shorter telomeres.

22:22

People who regularly sleep six and a half to 8 hours have longer telomeres. People who regularly have sex have longer telomeres.

22:29

We understand that something that is done regularly here, The Villages. (laughter)

22:35

So be careful how you look at each other. Well, here is

## **Telome**

22:43

if you had seen this couple in the front row, you would say they're there. They're not going to be here very long.

22:50

They're running home. (laughter) So anyway, you're going to learn about telomere elongation.

22:58

And in fact, that's one of the things that Aviv does really well. Just imagine if you had it, you could repair every part of your body,

23:08

young heart, young brain, young cartilage, young skin, young eyes, young gut, etc..

23:15

That's the promise of getting more telomeres. And you've already got it here.

23:20

That's right. Let me go back on that one just to show you,

23:26

since you've got it here and the rest of us are envious of it.

23:39

So low oxygen is the greatest stimulant for stem cell reproduction.

23:45

What's the problem? Well, oxygen kills you. But if you can trick the body

23:50

into thinking it has low oxygen, you get longer telomeres.

23:56

And that's what the hyperbaric hormetic hyperbaric or the paradoxically

24:01

hypoxic stem cell proliferation that Aviv Clinic does. Okay. 14 areas.

24:08

I'm going to show you one more of the areas. One crazy thing. So at UC San Francisco,

24:16

they looked at every drug approved the FDA with the new IBM quantum computer.

24:21

I can say that because the new IBM Quantum computer is located at the Cleveland Clinic and what they find

24:27

they look for, does any drug block the attachment of amyloid

24:33

and TAO to your brain neurons and they found a drug that did it, Bumetanide

24:39

which is a \$4 a month water pill. It's largely been replaced by Lasix or hydrochlorothiazide,

24:46

but it's approved by the FDA and is generic. They then looked at that in a mouse model of Alzheimer's disease

24:53

and it totally blocked the development of Alzheimer's disease in the mouse.

24:59

They then looked at it in two large databases, a 1.8 million person database at UC San Francisco, 3.8 million in ours

25:07

And what they find is 70 and 72% reduction in dementia of all kinds.

25:16

What are we saying? It's the damaged protein that is amyloid or TAO that attaches to the neurons, that causes

25:24

inflammation, that kills your neurons and causes dementia? If you block that damaged protein from attaching, maybe you can block it.

25:33

That's what they think the theory is or the hypothesis is. It's now undergoing randomized controlled trial.

25:39

That's what's happening in medicine. We are advancing it fast enough so that maybe we'll be able to

25:46

some of the devastating diseases. Let me go back to the aging mechanism. My favorite, other than telomere

25:54

elongation, is epigenetic reprogramming. You've heard a little bit about that.

25:59

What is epigenetic programming? Well, your epi genes remember the switches that control of your genes

26:06

are on and over time your epi genes get damaged, your epi genes are out in the cell as well as the cytoplasm.

26:13

They go between the two. Your genes stay really protected in your nucleus, so your epi genes or what they have gets damaged

26:21

and when you replace them by turning on four genes, we have the repair system

26:29

for almost everything in our body. And when you turn on these four genes, you repair

26:36

your epi genes back to the way they were when you were an 18 year old. Can you remember your 18 year old?

26:43

Okay, so repair it back to the energy you had, the vitality, you had, everything else you had when you were 18.

26:49

When given to the old mice. It makes them young. Their spleen, their skin.

26:54

everything, their brain, their muscle. Older wide therapy, pancreas, muscle, all back to normal.

27:03

And they live about 50% longer. What was the problem? The problem in this was that when you turn on all four of these genes,

27:12

20% of the mice develop a cancer within the equivalent of two human years.

27:17

So it never went anywhere until about three years ago when it was discovered by the same group

27:23

and by the way, the guy who discovered the whole process is Yamanaka. He got the Nobel Prize for his work.

27:30

But now six labs have discovered that if you only turn on three of these genes, you don't turn on c-Myc,

27:37

You get the young mouse, the young dog,

27:42

the young rat. It's just moving into human trials now, but you get young all over again.

27:50

And so there are many of these processes. There are 14 of them, but you've got one that's actually working now

27:57

in that place at the Advanced Center for Health Care.

28:03

So I'm going to skip a bunch of things because I'm running out of time, so don't worry about it other than you are genetic engineer for you.

28:12

And I'm going to skip some of these just to show you things you can do.

28:19

If I can go fast enough. So any of you, by the way, you're welcome to have the slides,

28:26

whoever you contact at Aviv Clinics will give you the slides. But there are 40 things that have been shown

28:33

in at least two studies in humans that change your rate of aging of your brain in a prospective way.

28:40

And so I'm going to go over a few of them. One of them is immunizations. So this is a flu shot.

28:47

These are this is the third of the studies. If you had no flu shots for some reason, there it is.

28:55

If you had no flu shots, you had a 40% increase in dementia over the five years compared to

29:03

if you have gotten a flu shot every year after age. I think it's 65.

29:09

So one of the reasons to get a flu shot to prevent dementia. Why?

29:14

Because the flu causes enormous inflammation and inflammation

29:20

is what destroys our neurons after something bad attaches to them. Another one is do four

29:26

components of physical activity and speed of processing games. What are the four of physical activity?

29:33

Well, one that you heard already about. I'm sorry, I'm going. This is 10,000 steps a day and yes,

29:40

4000 steps is better than 2000. And 6000 is better than 4000.

29:46

But 10,000 is the ideal point. It doesn't matter whether you're a man or woman, doesn't matter your age, doesn't matter your ethnicity.

29:54

And if you wanted to prevent brain dysfunction, 10,000, that's the upper panel on the left here is idea of 10,000 steps a day.

30:03

It came from a Japanese pedometer manufacturer who was just trying to sell pedometers,

30:09

(laughter) but maybe he knew what the hell he was talking about because he was right.

## Speed of Processing

30:15

So remember, you get to control your genes when you do speed of processing games,

30:21

when you injure a muscle, what happens? You lift a weight, you tear it a little, it sends out a repair.

30:28

You're turning on a repair gene that says, I'm building that muscle stronger. And that's what happens.

When you jump,

30:36

you cause a small fracture in your hipbone and guess what? You repair it stronger.

30:42

That is, it's a microfracture and you turn on a gene that repairs your hip bone. Same thing with your brain.

30:48

When you do speed of processing games, we now know you turn on a gene, you injure the nerve a little bit,

30:55

but you turn on a gene that repairs it and it keeps your memory stronger. You want to know the name, you can impress someone for you at the next cocktail party.

31:04

You can say, What's NPAS4? No one will know it. Bet them on it because there is the repair gene for your brain's functioning.

## Smells

31:14

You are a genetic engineer. For you, I'm in red. Am I? Over time.

31:19

Okay. Four smells a day. I'm going to go quickly. 2 minutes. Four smells a day, prevents dementia

31:27

and reverses it in two randomized controlled trials. So coffee, garlic, onions, alcohol, whatever four smells

31:36

you want, that does it. But it has to be intentional. Hearing aids prevent dementia, get them

## Coffee

31:44

If you have hard of hearing. If your wife tells you you're hard of hearing, get the hearing aids.

31:49

She's right. Okay, guys. Yeah. What black coffee also does it.

31:55

That's why I take it on stage and I'm going to do a couple more if I can.

32:04

Extra virgin olive oil, half a tablespoon a day prevents it.

32:10

And if you will, it is keeping your proteins young.

32:15

And we would go one more slide. I think maybe two. Five tips for you.

## Summary

32:22

Change your attitude. You are a genetic engineer for you.

32:27

What you do today matters whether you walk or not, matters whether you have a steak versus salmon matters,

32:36

how much sugar you have matters. Only eat food you love and that loves you back.

32:42

Food is like a marriage. You wouldn't marry someone who is trying to kill you every day, would you?

You shouldn't eat food that's trying to kill you every day.

32:51

Choose a team. None of us can do this alone. There you are. You guys are so God darn lucky you've got Aviv here.

32:58

Not only do they do the hyperbaric, but they do everything surrounding it in that list of 40 things

33:06

Add speed to your body and brain, smells, coffee and olive oil and manage stress.

33:12

Meet your neighbors because cultivating your posse and passion and play are key.

33:18

You get a lot of play and posse here so cultivate passions as well. Thank you very much and I'm sorry I'm over