The Tim Ferriss Show
How to Reverse Aging with Art De Vany

Tim @ 5:07:
Hello, boys and girls. This is Tim Ferriss, and welcome to another episode of The Tim Ferriss Show. I’m sitting in a cabin surrounded by snow, and it is still my job every episode to deconstruct world-class performers of all different types, from entertainment to military, chess to Jiu-Jitsu. You name it. I have tried to interview the best of the best in that world, and in this particular episode, we are going to talk about anti-aging. What does that mean? Well, there’s a lot of hogwash, a lot of nonsense out there, but there are a few people who really stand out as particularly interesting because they walk the talk. Dr. Arthur De Vany is nearly 80 years old and totally ripped. I just spent a bunch of time with him, and better known as Art De Vany, and you should check him out on Facebook, Facebook.com/art.devany, D-E-V-A-N-Y. He was signed as a professional baseball player in his youth and later earned his PhD in economics at UCLA.

He is most famous for his evolutionary fitness, that’s the term you would use, approach to training and diet, and our conversation, folks, is a lot on the subtleties and details of that. During his time at UCLA, Art did many things, including creating mathematical and statistical models to precisely describe the motion picture market. Art is now Professor Emeritus of Economics of the University of California at Irvine and is a member of their acclaimed Institute for Mathematical Behavioral Sciences, so this guy’s very analytical. He’s very mathematical, and very, very logical. And that is the water on the kettle, but I’m going to power through it, because I’m going to have tea, but it’s going to be after this intro is recorded. A lifelong student of metabolism and fitness, Art has lived as a Paleo athlete for more than 30 years and is considered a patriarch of the Paleo movement right up there with Loren Cordain. He believes there’s no such thing as healthy aging, and that we can intervene to protect against the aging process.

And in this episode, we talk about his daily schedule, workout routines, Nassim Taleb, why he never gets sick, that is, why Art never gets sick, and really dig into the details of a fascinating man. There’s also one point where I doubt myself, which happens fairly often, and I mention myotatic reflex, and then I renege and say I don’t know what I’m talking about. So just to explain what I meant by that, here’s the definition. “The stretch reflex, also known as myotatic reflex,” this is from Wikipedia, “is a muscle contraction in response to stretching within the muscle. It is a monosynaptic reflex which provides automatic regulation of skeletal muscle length. When a muscle lengthens, the muscle spindle is stretched and its nerve activity increases.” That sounds like gobbledygook to a lot of you, but that is why I said myotatic reflex. It’s related to doing negative-only, or negative-dominant, workouts, which arc … Arc. Art subscribes to.

All right, so there you have it. There’s a lot of dense stuff in here. We get into the weeds, which you guys love, but if you’re having trouble grasping something, and it’s getting very dense, just hold on and listen for a few more minutes, and we’ll get back into more familiar territory. We talk about everything from ice ages to economics to the philosophies of intermittent everything. We talk about the extreme events and the economics thereof. It’s a fascinating conversation, at least it was for me, so without further ado, as I always say, I’m going to go get my tea now, and please enjoy this conversation with Art De Vany.

Tim @ 8:32:
Art, welcome to the show.

Art @ 8:35:
Happy to be here, Tim.
**Tim @ 8:36:**
I am thrilled to meet you. I’ve heard so much about you from many people, including our mutual friend Naval Ravikant, and we’re sitting here, for those people listening, at my undisclosed mountain location, and Art was kind enough to meet me here, and here we are at the kitchen table, and I thought we would just start with how you connected with Naval, because I don’t know the story.

**Art @ 9:00:**
Oh, it started with my blog. He got in touch with me, and I decided to give a seminar in Las Vegas covering sort of the elements of my approach, and he and his brother Kamal attended, along with John Durant …

**Tim @ 9:18:**
Sure.

**Art @ 9:19:**
… and Richard Nikoley, and then a whole bunch of other people who have gone on to fame and fortune in the Paleo world.

**Tim @ 9:26:**
And you’ve kept in contact with Naval, or at least he is certainly very familiar with the blog. If we rewind the clock a little bit, how did you go, or actually, I’ll take a step back. I was going to ask you how you went from economics to the evolutionary approach to everything, but before I go there, how did you get to economics?

**Art @ 9:49:**
Yeah, well, I love economics. It’s study of decentralized mechanisms and organizations and spontaneous order. I got into it because I took a undergraduate class in comparative economic systems at UCLA, and I had a professor who was just profoundly inspiring in that class, George Murphy. I give him credit. He may disclaim my credit, but he was so eloquent in talking about Hayek and, oh, God, Enrico Barone, and a whole bunch of other people who wrestled with central planning. This was a time when central planning was sweeping Europe and was being promoted even in the United States, the progressive movement, at that time. They felt that centralized control, scientific management, top-down hierarchical control, would be the sensible way to do. In fact, I wrote a book about the inland waterways that criticized that approach and talked about how … They actually messed up the floodplains, and they thought there was a 100-year floodplain, but floods don’t have means, statistics. They don’t converge. They diverge, so the variance keeps growing with every new flood.

**Tim @ 11:16:**
What is that, for people who don’t have any familiarity with economics? What does that mean? If you could maybe elaborate on that.

**Art @ 11:22:**
Well, the variance, of course, is a measurement of the variation in the series, and the series, if it has a mean, most people think in terms of normal distributions, it has central tendencies, and that the mean and variation are well described by those two parameters. Not true. The damage that’s done by the worst rainstorm in a decade does 40% of all the damage that rainstorms do in that decade. It’s extreme-event-dominated series, just like the movies, and just like your life. People fail to realize you don’t get anywhere from drip, drip, drip of the incremental. You get there from some big event that changes your life, like your book probably change your life. I don’t know what changed my life. Lots of
things have. But those are the moments that are the power moments in your life, and in fact, the whole notion of “normal” doesn’t apply to a person’s life. You don’t get anywhere by incrementing in small increments. It’s the extreme event, and you seize it, and you’re poised, and if you remain poised, you can respond to that kind of significant event.

For example, there’s this notion of algorithmic compressibility, which is a computer science term that applies to the ability to reduce your life to an algorithm. Can’t do it. Can’t do it if the novelty in your life is constantly progressing, and you should welcome the variance, seize the opportunities. That’s the way I think of life, and it’s the Zen of evolutionary fitness. That’s how life works out.

Tim @ 13:17:
So we’re going to spend the majority, I think, of our conversation on evolutionary fitness, and I have so many questions for you, but I want to start with an area I know even less about, which is Hollywood.

Art @ 13:30:
Yeah.

Tim @ 13:31:
So what are some of the erroneous beliefs, or that you found in Hollywood, or insights that you’ve written about and studied?

Art @ 13:45:
Well, it’s an industry that nobody understands. Nobody’s really written anything very sensible about the industry. The Supreme Court, for example, divorced the studios from the theaters, and Justice Douglas was the guy who wrote the decision, the famous Paramount antitrust decrees. They treated the industry as a monopoly, because they looked at market shares, which, if you measure at a particular point in time, Paramount will have so many dollars of the total revenue of the industry, Universal will have so many, and on down the line. Problem is, that changes every week, so if you use something like a Herfindahl index, or a measure of concentration, it’s constantly varying. In fact, it has no mean.

It’s the second moment of … Excuse me, but it’s the second, it’s the variance of the distribution of market shares, the Herfindahl index is, and it’s infinite. Doesn’t exist. Mandelbrot wrote about this. So did … Oh, who’s the other guy who did fractals? Anyway, it doesn’t matter who the …

Tim @ 14:57:
Was it Mandelbrot?

Art @ 14:58:
Yeah. Yeah, Mandelbrot. He coined the word “fractal” because it’s a situation where the variation is so extreme that the distribution itself doesn’t have the normal kinds of limits. It’s a so-called wild distribution as Nassim Taleb calls them. And these wild distributions don’t have finite moments necessarily. The median variance may not exist, such as in the flood example, and that’s true also in the movies. Turns out that the movies has such a wild distribution that even the mean doesn’t exist. So if you talk about the average gross, you’re talking about no movie that ever made that.

Tim @ 15:45:
It reminds me of … There was some type of joke that was meant to illustrate the flaw in how people misapply arithmetic mean. Bill Gates walks into a bar and suddenly the average net worth is 50 million dollars, or something like that.
Art @ 16:03:
Bill Gates walks into a bar, and everybody's a millionaire on average.

Tim @ 16:07:
Yeah, exactly. So does this make movies impossible to predict or plan for? How do you build that in? If you ran a studio, how would that inform what you learned, how would that inform decisions that you make?

Art @ 16:21:
Well, you've got to have a story and characters the audience will love. As you remember Callie Khouri; she invited me to come speak to the Screenwriter's Guild, and she said you make a movie by ... You make the audience love the characters, and then you torture them.

Tim @ 16:42:
Torture the character? And I guess visa vie the character, the audience.

Art @ 16:47:
Torture the characters, right. So the idea is that you ... Great script, great story, memorable characters, and the rest is up to the audience. It may or may not work. An actor has the same kind of variance in his career grosses as does the industry in general. So an actor will make one movie and that movie will earn 40% of that actor's career revenues. Same thing with directors.

If you did all the regressions in the world, a statistical technique we find to predict what a movie's going to make, you would find out that a handful of actors have any significance, and they're sort of flukes anyway. Like Val Kilmer came up in the regression equations. He's gone now, and it's not that the past doesn't predict the future is really the way to look at it.

And there's no algorithm to determine how a movie's going to gross. Genre is somewhat helpful, but only because people look at genre ... Genre is not a category; it's something that people ... It's a box people put movies in. If you really wanted to know how much a movie's going to make, you have to look at how many theaters they opened it on.

It's the cereal box effect. If you go into a grocery store, and Wheaties gets all the shelf space except for a few inches, it's going to have the highest gross. It might disappear very quickly, though, because a big opening is a dangerous strategy. It tends to give you dominant revenues in the early weeks, and if people follow the revenues as a means of making a decision how to go ... Which movie to go to, that would tend to propel a dynamic where you would have an expansive gross.

The problem is you also have word of mouth, and reviews. So it's a mixture of public and private information, private information being what your friends tell you about it, public information being reading the box office scores. You put those two together and you just have an enormously complicated dynamics. You can't tell how it's going to do.

As a matter of fact, if you don't get the grosses, and you get 4,000 theaters committed their screens to your movie, you may have to allow them to double bill in the second week. That is, add another feature to it. If you see a movie that's double billing by the third week, it's a stinker.

Tim @ 19:30:
And I would imagine it's similar to books, too. I suppose in any hits-driven business, there are some people who try to front load with distribution, so that have this huge initial up front cost in the hopes that it will make the list somewhere at the top, and then become a self-fulfilling cycle of sorts. People
use it as a shopping list.

Art @ 19:53:
It is the same kind of thing. And actually, a lot of authors will go out and buy lots of copies of their book.

Tim @ 19:59:
Oh yeah, I know people who have bought ... I remember I visited, I shall not name names, but I went to the office, the headquarters of a CEO who had recently published his own book. Or I should say had his book published, he did not write. And there were tens of thousands of copies lining the walls. It was just outrageous. He could have built an entire structure out of these books.

Art @ 20:24:
Well, the public has to ... They're smart. They learn that if you just look at the sales itself, that's what a lot of other people are doing, but it could be that they're manipulating the sales as a way of signaling to you that it's a great book. So you look at reviews, and you see what the author's done before. It might work if you're Tom Hanks in a movie, but then again it could be ... He said he has huge variance in his grosses, also. He's not a sure thing.

What a star will do is it will raise the least revenue a film might earn.

Tim @ 21:04:
I see, it raises the ...

Art @ 21:05:
The minimum revenue. Because it gets it out on a fair number of screens and some people will come. But then word of mouth starts to take over, and it can tank in no time.

Tim @ 21:17:
So you developed these mental models, these analytical frameworks. How did fitness and diet enter the scene for you? And how did you start focusing on that?

Art @ 21:33:
It really began the other way around. I always wanted to be fit and strong, and have a beautiful body and healthy looking skin and so forth. And just liked people liking me and looking at me, so. Ego helps a lot in this game. But I also was interested in fitness and eating well most of my life. However, that blended with ... That, and plus my interest in athletics. I wanted to be a pro baseball player. My sight let me down.

So that mixture led me to appreciate the hunter/gatherer kind of lifestyle. That is, if you view uncertainty in the world the way I do, and you realize that we came through a narrow bottleneck only 2,500 or so humans made it through the Toba ... The post-Toba volcanic eruption. Volcanic winter ... That was the lowest temperature in the last 20,000 years was post-Toba. And so we came through a bottleneck like that, you realize that we have to be extremely hardy, very robust, you had to be poised. The brain is there in order to adapt to the climate variations that humans went through. There were 20,000 years of extreme climate variation. And a good brain is a good way to get through that sort of thing.

You can imagine God's designers ... Human designers saying “Well, we've got a new model now. It's different from the archaic model in the sense it has a very large brain. It's smart as hell, but it's kind of fat and slow.” And God just says “Well, let's see if it gets through the Ice Ages. I have 20,000 years of
ice ages planned ahead of him.”

And that’s what happened. The archaic form didn’t last, and all the other closely related forms of human beings disappeared at this time. The Neanderthal, Homo habilis, and a host of other … Even Homo erectus was still around early on in this period 200,000 years ago. So they all disappeared, and they all disappeared because they didn’t have the adaptive behavior that modern humans have. That brain was the survival instrument.

That means that we’re here, we have a great brain simply because it’s a way of adapting to the challenges that the world presents to us, and you couldn’t have the brain that we have unless you had a body as well. The brain body … brain muscle signaling dominates most of my thinking. So an approach to fitness … Well, think of the sea squirt.

**Tim @ 24:39:**
I’ll admit, I don’t know much about sea squirts.

**Art @ 24:40:**
Sea squirt’s a little polyp that lives in the sea, and it floats around, finds a location, latches on to that Barcalounger, and eats its brain.

**Tim @ 24:53:**
Eats its own brain?

**Art @ 24:54:**
Eats its own brain. Because it’s found its place, it no longer has to navigate the world, and the brain is dispensable. And every bit of protein and substrate that an animal can get ahold of, of course it’s going to eat. So at that point the sea squirt consumes its brain. A lot of people do that too don’t they?

**Tim @ 25:13:**
Yeah, I was gonna say I think a lot of that’s happening right now.

**Art @ 25:16:**
Yeah, yeah, settling into a couch you lose your muscle, your brain begins to degenerate because it’s not getting the signals that the muscles, muscles release all kinds of so called myokines, now that have been discovered and also a remote signal from muscle can cause your brain to improve its cell quality. To maintain neurons, one thing you could do is to contract muscles and you’ll find you improve what’s called proteostasis in the neurons. Proteostasis is maintaining the cellular quality, not having misfolded proteins, misshapen proteins or all kind of proteins in your…

**Tim @ 26:01:**
Is that related to a brain-drive neurotrophic factor or things like that or is it a different mechanism?

**Art @ 26:08:**
It also does that. See neurotrophic factors are typically growth type factors that risk you a stressed cell and that does happen but the other part of it is that you need to alter pigment insulin signaling so that you’re actually, bring on the defensive pathways in that neuron as opposed to the growth factors and growth signaling. So that would bring on the FoxO and Sirtuins and other factors in the neuron. So that kind of signaling, if you affect proteostasis in the brain, the brain then can send neural signals to affect proteostasis in your remote tissues. Now we’re into this motion of remote signaling. You’re signaling at a distance, which is systemic signaling. Economists love that. We’ve kind of modeled that adaptive decentralized behavior.
Tim @ 27:10:
And what types of, if we're looking at, for instance I was listening to one of your presentations and on one of the slides I just wrote down two lines and it reads, “aging is not programmed because of the result of the failure of a renewal program.” And so I would love to hear you A, elaborate on that maybe a little bit and then B, follow that through with the implications in terms of behaviors that might help, or diet, anything that might help to bolster that renewal system.

Art @ 27:53:
Well aging is really a puzzle. I only started studying a few years ago and I figured well I'm an expert cause I'm experienced. I was about 78 years old when I started looking at aging and as I thought it really is a lot simpler than people are making it out to be. It is not programmed, there's no aging genes have been discovered. The only genes that have been discovered to have any baring on aging are defensive pathways, FoxOs, Sirtuins, proteostasis, a host of other defensive, immunity, stem cell proliferation.

There are four or five pathways that are involved in aging and in the main they are regenerative or defensive pathways, like the immune pathways cross over with your cell maintenance, defensive pathways. For example, autophagy is used in both processes. Autophagy being the consumption of self tissues, so own tissues; “phagy” meaning eating and “auto” meaning you, your own tissues. So autophagy is both an element of the immune system, it's also an element of keeping the stem cells alive and healthy because they're living on autophagy and when they need to proliferate and come out and heal the wounded tissues they go through a burst of autophagy and then they transition into oxide dephosphorylate… they use up oxide for pathways after that. They're in there being defended by autophagy so if the mitochondria don't damage the stem cells they have to live in a low oxygen niche, in fact it's very similar to a very primitive form of cell. They live on basically glycolysis and that was all life lived in one time and your fast twitch muscle fibers also use the most primitive kind of energy sources for movement.

So, the defensive pathways are really the key to it all and the poets know this. The legend of Tithonus is a legend of the Greek god, Aurora's boyfriend and Zeus didn't like it so Aurora pleaded with Zeus not to kill him. So Zeus in his clever way said well okay you're gonna live forever but he didn’t. He forgot to say I'm not gonna let you age so if Tithonus wastes away for eternity so it's a cruel punishment it's a correct description of what the aging process is. It's a loss of cell function, loss of cell integrity, a loss of the ability of stem cells to renew tissues. So aging basically is simply damage.

Tim @ 31:07:
What are some of the interventions that you found most interesting at this point?

Art @ 31:13:
I eat only twice a day so I work long intervals between meals. I'm on low insulin signaling so that I bring on the defensive and repair pathways. I want to be conscious of maintaining my stem cells, and how do you maintain your stem cells? Well, first of all you don’t have too much mitochondria density down in your stem cells.

Tim @ 31:32:
So yeah I really wanna talk about this. Okay, mitochondria density is all the rage. All right.

Art @ 31:39:
It seems to be all the rage, listen, they're innocent little batteries that just sacrifice and produce energy for you. Remember they have their own DNA. So, mitochondria density has to be very low on
stem cell tissues. Moreover, the mitochondria at activity level, for example, humans, people don’t
know this, humans have the lowest mitochondria density of any mammal.

Tim @ 32:08:
Really?

Art @ 32:09:
Yes, and they also have low reactive type of mitochondria, the L3. Well all came up out of the L3
mitochondria haplotype that left Africa. Mitochondria yeast occurred about 160, 138,000 years ago.
By that time humans were huddled on the sea shore of South Africa trying to survive. The
temperature was so cold, and so much ice was locked up moisture that the Sahara expanded in
scope and became very arid. So after Toba volcanic eruption, the largest volcanic eruption in the last
two million years, humans were basically settled and lonely. The southern and eastern shore of
Africa, huddled there to survive, and then the Curtis Marean thinks that the sea shore saved
humanity. The accessibility of sea food along the shore. Vegetables were wiped out for about a
thousand years. There was a thousand year volcanic winter and vegetables were difficult to come by
and the inland sources of animals were sparse as well. It turns out we may have survived on corms,
they’re a starchy plant that is in the biome of southern Africa.

Tim @ 33:38:
Corbs?

Art @ 33:39:
Corms, C-O-R-M-S, corms.

Tim @ 33:43:
Ah yes, I’ve seen this written.

Art @ 33:44:
It’s a carbohydrate containing, I hate to tell the Paleo guys this… but between the muscles and the
washed up seals and the occasional beached whale and the sea birds and the occasional inland
hunting, that was basically how we survived. Mussels are your friend and both kinds of mussels. So
there’s the survival aspect of the DHA, of course, in the sea food became substrate for the brain and
you can see the remarkable photos that show the different between a hundred thousand years
difference in the human skull. It’s a profound difference. You can see that the human skull, the modern
human skull that emerged is kind of a juvenilized version of the earlier skull and the hyper prefrontal
area of the cortex and what have you. So brain expansion clearly occurred in response to two things,
the availability of nutrition to help propel brain growth, the need to have high brain cognitive power to
survive the ice ages plus the growing settle in size on the sea shore because we now had a stable
source of food. I’m thinking of us coming from that period, and that’s spurred technology and
remember language developed at this time too, so there was this enormous change in human
behavior during this time period.

Tim @ 35:21:
We were talking about the interventions. You mentioned eating two times a day, and we’ll come back
to this I think, but is that generally breakfast dinner, lunch dinner, what’s the, what does your split look
like?

Art @ 35:35:
Whatever suits you but I do lunch, I do breakfast dinner because I want a long interval between meals
to promote proteostasis. I want to clear the enzymes. I want to … Remember you’ve got, there are
about a billion proteins in a cell, according to Dillon’s group up at Berkeley. It’s very critical to... the degradation of the proteins is sort of a continuous process but the transcription and making new proteins is an interval based kind of thing. It depends on when the nutrient signals are there and when the mTOR begins to say, “Okay, don’t consume proteins make new ones,” transcribe and translate. Although, when you transcribe and translate, you find that that moves up a diagonal.

The atrophy process follows it because you’ve got to keep some kind of balance there. If you over... my theory is this, we had to overeat in order to survive. We don’t live on energy balance and if you look at this as a random world, you can’t survive unless you overeat during periods when food is available, so as to store nutrients for the times of scarcity. We also over proliferate. That is, when nutrients are available, the transcription and translation process turns on it sort of a burst. Has to be because otherwise you won’t make enough proteins to survive. Your cells won’t be durable. That is what’s killing us today because we’re over transcribing. We’re overeating. We’re making too many proteins. They get misfolded. They get damaged. There’s no room for them. The architecture of the cell is stretch. The actin fillaments are stretched out and there’s stress signaling going on. You don’t transcribe accurately. You don’t make good proteins when you’re under stress.

Tim @ 37:37:
We also talked then about the low mitochondrial density near stem cell niches, I guess you said?

Art @ 37:44:
Yes. They reside in a low oxygen niche.

Tim @ 37:47:
How do you proactively encourage low mitochondrial density in those areas?

Art @ 37:53:
You do weight lifting. You stay off the treadmill. Actually if you sprint, you can use up, you can consume mitochondria because you improve mitochondrial quality.

Tim @ 38:11:
I got it. They become more sort of effective and efficient so they don’t need, you don’t need the density.

Art @ 38:16:
That’s right. They are not just... they don’t rely as much on oxidation either. You’re using the glycolytic pathway, which goes through the mitochondria anyway, in the kreb cycle and so forth. It’s not producing lots of free radicals.

Tim @ 38:33:
Are you responsible for getting Nissam Taleb dead lifting? Is that ...

Art @ 38:40:
My fault. Well you remember the story about Nissam. If you read the back section of, the little section he wrote for my book because he, here he was a cratosis trader, that is, he used distributions with mild characteristics. He was buying out of the money calls and puts, and living on the variance.

Tim @ 39:05:
Right. He was living in the options world.

Art @ 39:09:
Yes, that's right. Here he was doing just steady, steady exercise. I said, “What are you doing? This is the wrong approach.”

**Tim @ 39:19:**
Just so I know, because … How did you first, how did the two of you connect?

**Art @ 39:24:**
I used his book in a class I taught, Fooled by Randomness, I used in a class I taught on the economics of uncertainty. I told him, I communicated with him. I said, “I’m using your book,” I don’t know why I wrote him, but I … Because I hate textbooks. That really connected with him. He said that he hates textbooks too.

**Tim @ 39:47:**
You really hit a sore spot. You get him started on academia. You connected with him and then he was doing steady state exercise.

**Art @ 40:01:**
He was doing his three sets of 12 and so many hours on the treadmill or the cycling or whatever, and he figured out that in cycling to and from his office, that’s when he … His office was some distance from his gym, he said he figured out the maximum expenditure of energy in that ride was what did him the most good. That’s your approach too. That’s four hours. For example, in an organization the … Half the work is done by the square root of N workers, so you got 100 people in there. Ten workers produce half the output.

**Tim @ 40:46:**
Sure, I mean we’re on the same page with this in terms of pareto distributions.

**Art @ 40:50:**
Right and this is all just prices work and Locke and others have looked at, scientific published and what have you. The Pope has his own version of this by the way. Pope John Paul, before he passed away, he was asked how many people work at the Vatican. He said, “About half of them.” Of course Robert Evans says the same thing about Hollywood. Hollywood’s a place where half the people are not working and it’s true. They’re between films and they’re hoping for their next one and so forth. Even Dustin Hoffman is great. He said, “I have to be grateful to be working.” This goes with the business. In the industry, there are these power law distributed networks and a few people are at the central hubs, and so it’s the same rule, really holds for the movie industry. Probably half the people move up. Ten percent of the people do about half the movies or something like that.

**Tim @ 41:49:**
Nissam thought that the calorie expenditure during his bike ride is what was giving him the most bang for the buck.

**Art @ 41:56:**
Can you imagine that people were that dumb back in those days, and there’s still people around who think that it’s an energy balance model. I don’t know how. Well, let’s face it. They all studied steady state exercise because you put someone on the treadmill and you measured his oxygen expenditure. Nobody had any idea. Non-steady state exercise is very difficult to quantify. Now they’re getting better at it, much better at it. The power law holds again because the most intense exercise, the most intense expenditures to the ball, you put accelerometers on children. The leanest are the ones who engage in the most intense bursts. Little children don’t steady state exercise.
Tim @ 42:46:
What does your exercise regimen look like or what you would prescribe to someone like Nissam or anyone really?

Art @ 42:54:
Well I told Nissam to start doing negative dead lifts if he wants to improve his dead lifts. Have somebody help you put the bar up, lower it, pick a height and then put it up again, and lower it again, and put it up again and lower it again. I do almost all negatives now.

Tim @ 43:14:
Why is that? Can you talk about why are eccentrics so important?

Art @ 43:19:
Well, I’m doing eccentrics for really three reasons. The main one being that they double your stem cell counts, in the satellite cells in the muscle. They double them but they don’t exhaust them. A lot of people, if you doubled the stem cells that flood out, you may exhaust them because you may simply exhaust the ones in the niche. What you want to do is, you want to double them and have one go back into the niche and one go out and heal tissues, asymmetric differentiation is what you want. If they symmetrically differentiate, they both become new possible progenitors to cells, you’re now exhausting. Put one, take one out, put one in. It is the best way to do it and eccentric exercise does that. Downhill running does too.

Tim @ 44:09:
Downhill running?

Art @ 44:10:
Downhill running.

Tim @ 44:11:
How do you... so I’d love to hear what a negative, focused workout of yours might look like, and if you could also just talk about mitigating injury risk because there are a lot of people who get, for instance there are a lot of sprinters who, in their training, will only do the positive on dead lifts and drop them for fear of hamstring injuries, so not to say it can’t be done safely because I’ve done a lot of negatives, but I’d love to hear what a workout of yours looks like.

Art @ 44:43:
It’s so mild you wouldn’t believe it. I work out almost every day, maybe 10, 15 minutes and sometimes it’s hard to do a negative if you don’t have a training partner, but I use equipment and I’ll use, like for example, leg extensions. Push up with two, lower with one, typical. Leg press, push up with two, lower with one. Shoulder presses. Push up with two ... Actually, I use a machine and in this case, like a power hammer stuff. I’ll push it up with two hands and then lower it with one.

Tim @ 45:19:
Mm-hmm (affirmative).

Art @ 45:21:
Deltoids are all fast switch, mostly fast switch fibers, so they really respond well to that.

Tim @ 45:28:
What body ... Since you just mentioned it, which muscle groups respond best to this type of training?
Art @ 45:36:
All of them.

Tim @ 45:37:
All of them, okay.

Art @ 45:38:
The posterior muscles, they’re slow twist fibers. You need to … They need to have endurance, keep your posture locked in … I end every workout standing against the wall. This was the thing Naval liked most about my seminar, standing against the wall. Get a little slop in the small of your back. Put your heels and butt against the wall, your shoulders back, your head back, walk off and leave … look over your cheek bones. Don’t drop your hands and start looking down. Your whole spine collapses.

Tim @ 46:11:
So look straight ahead?

Art @ 46:13:
If you need to look down, just look down over your cheekbones. Don’t drop your head or you’ll descend your head and rest of your …

Tim @ 46:21:
This is to establish proper posture?

Art @ 46:23:
It is to establish proper posture, but also to maintain it and have a sort of nobility of having good posture. It really makes a difference in your mental attitude.

Tim @ 46:35:
Are you working your entire body every day?

Art @ 46:39:
No, I’m not, because I may want to … I might do legs and shoulde in one day and I might … I almost never do curls, because they’re just ego muscles anyway. But I just go around doing a variety of exercises. I make sure to hit every body group a couple times a week and I’m cycling through… I do a lot of lat and lower back and leg work and shoulder work.

Tim @ 47:06:
When you do 10 to 15 minutes, how do you choose? Let’s just take an example in the shoulder press. How are you determining what weight to use as a percentage of say, one rep concentric, and then what is the tempo, number of repetitions? If you could just give us an idea of the programming of that.

Art @ 47:26:
I’m such an instinctive trainer like Arnold is.

Tim @ 47:31:
Yeah.

Art @ 47:32:
I might … I just don’t have particular way. I just do it.
Tim @ 47:37:
Okay. Do you go to the point where you start to lose the ability to control the descent or when do you terminate-

Art @ 47:44:
Yeah, I do. I have some sense of fatigue, but what I do, is I push it up really fast and quickly. A very precise form, a very … Lots of acceleration and coming down really slow and to a full, good stretch. You have to … Remember, you have this giant protein in your muscles, this tightened protein, it’s the stress sensor and stress, by the way, will stimulate mTOR and protein synthesis.

Tim @ 48:14:
The stretch?

Art @ 48:15:
Yes.

Tim @ 48:16:
That’s the … Is that, and I might be getting this wrong, myotatic reflex? Am I getting that wrong? Something like that. I don’t know what I’m talking about. Please continue.

Art @ 48:22:
Okay, well there’s a signalling down in the … The tightened protein passes … It sets the architecture of the whole muscle really and the action. There’s a cytoskeleton and a skeleton in the muscle itself of these actin fibers and if they’re stretched and if they sense stretching, you get the dystrophin protein that senses the distortion of the enclosure of the muscle and if it tightens senses the extension of the muscle. That means you really go to a full stretch.

If you did curls and never fully stretched, you would have a little, tiny muscle, you’ve got to stretch the muscle out and Goldberg’s work and all kinds of work on muscle shows that full extension … You lengthen the muscle, too. A lengthened muscle is stronger and fuller when it’s contracted and it’s faster. I go … I want my muscles to be not too big, lean, long, and quick.

Tim @ 49:33:
Mm-hmm (affirmative). What, from a distant evolutionary standpoint, what would have mimicked the eccentrics aside from downhill running?

Art @ 49:42:
Any kind of running does it as you know, because every impact is eccentric-

Tim @ 49:49:
Right.

Art @ 49:50:
… stress. Any kind of lowering, of course. You have to lift and lower things. I suppose even carrying is a certain degree of eccentric exercise, but I only … See, this is stone age plus high tech.

Tim @ 50:07:
Right.

Art @ 50:08:
The high tech part is looked at Macaluso’s work on stem cell activation and there’s other work on it as
well. I want an efficient, time efficient, exercise to keep me injury-free and injury-free is really very important. I’ve had almost no injuries in the gym over 60 years of using gyms. I can think of one injury. You’re efficient, injury-free, the fast switch type of fibers are the ones you’re hitting when you do descending.

When you get older, your motor neurons aren’t as effective, so you want to have the kind of heavy stimulation of the fast switch fibers. They’re the ones that have the biggest motor neurons. And the way to do that is negatives. Very safe, very effective. Of course, you can’t do negatives on everything, because it’s awkward and what have you. You can at least concentrate on accelerating smoothly and rapidly up and then descending slowly. Doug McGuff likes this sort of stuff and probably the best thing about his exercise is the slow descent.

Tim @ 51:22:
Yeah.

Art @ 51:23:
But I would never work out hard enough where I have to rest a whole week. I do something every day.

Tim @ 51:29:
What’s the rationale behind that as opposed to having longer rest intervals?

Art @ 51:35:
Okay, well I want a renewal signal every day. The renewal signal is one, it’s fasting before exercise. Then the fasted-

Tim @ 51:46:
When do you work out, typically? When do you do this 15 minutes-

Art @ 51:49:
I probably work out at eleven o’clock in the morning, typically.

Tim @ 51:52:
Got it.

Art @ 51:54:
I get up at like seven or six and I’ll have a mild breakfast at eight.

Tim @ 52:00:
What would be some of your default breakfasts?

Art @ 52:04:
My favorite default breakfast is a giant smoked turkey leg with a bit of melon. They’re very inexpensive, and they’re fun to eat.

Tim @ 52:19:
Sounds fantastic. I wish I had some of that here. Unfortunately, I do not.

Art @ 52:25:
You can get two big turkey legs in a package at Walmart even and eat one turkey leg, and half, the third of a melon.
Tim @ 52:35:
Got it.

Art @ 52:36:
Then, I will work out at 11. I'll have a 15, 20 minute workout, because I like to go around and see if there are any girls there to look at, too, while I’m there. I won’t eat until four hours after. I’ll eat at five o’clock.

Tim @ 52:55:
Got it. So that’s your evening meal and then you don’t eat between five, and when do you typically go to sleep?

Art @ 53:00:
I might go to bed at 11.

Tim @ 53:02:
Okay. All right. No, but so you’d finish your last meal by six o’clock and have four or five hours of fasting before bed?

Art @ 53:08:
That’s correct-

Tim @ 53:09:
Got it.

Art @ 53:10:
I won’t eat until … Maybe even lunch the next day. It just depends.

Tim @ 53:14:
Mm-hmm (affirmative). Got it.

Art @ 53:16:
I never have three meals a day. I sometimes have one. Sometimes none. Most times two. But you don’t have to cut calories. It’s just the timing. It’s the intervals between meals where you have low insulin signaling, high autophagy and proteostasis mechanism, like the proteasome is eating up enzymes and you’re clearing the damage. You’re autophagy peaks at about four after, four to six hours, after exercise.

All these guys who guzzle right after their workout, they’re killing their adaptive process. You can’t have … Without proper autophagy, your muscles degenerate. You have to clear the old, damaged proteins, and that’s how you do it. The proteasome is that core-shaped barrel shaped object in the cell. That consumes mostly enzymes that have done their job, cleans enzymes. If you have enzymes that stay there too long or neural factors of some kind, like stress hormones, you have to eat those up. The whole thing is dynamic protein generation and clearance.

What I’m doing is I’m working out, I’m stimulating the autophagy process and the proteostasis is protein quality maintenance process. Four hours later, that’s peaked, it’s over, and I’m good and hungry have a nice, big meal.

Tim @ 54:57:
What does dinner look like? What would be an example of a dinner that you enjoy?

Art @ 55:03:
I have my wife hand me something, usually it’s … I used to do all my own cooking after my first wife passed away, but now she’s such a great cook. I’ll have a big mound of spinach with lots of garlic in it and there may be … She makes a lot of pot roast, her own way though, it’s more an Italian way. Of course, a fair amount of steak. I’ll have an occasional prime rib, but I always cut the excess fat off. I don’t like fatty meats.

Tim @ 55:34:
Is that just a personal preference or is there a scientific reason behind it, or just palate?

Art @ 55:42:
It’s both personal … I trust my taste and if something … if it’s just like, “Oh, this is too much of this”, I back off it. The other part of it is, if you want to have a fatty liver, you eat a lot of fat. There’s no way around it.

Tim @ 55:59:
Got it.

Art @ 56:00:
You know, you oxidize energy sources according to how easy they are to oxidize. First carbohydrate goes, then maybe protein or fat, but fat’s the last to go. It has to go somewhere. Excess adipose tissue is one of the worst things you can do. The body composition’s so crucial. If your liver starts filling up with fat, this is fat where it shouldn’t be. This is like ectopic fat. Then it’s also building up in your bone marrow, in your muscle, in your thymus, in your brain. Fatty degeneration is a source of stem cell dis-differentiation.

A stem cell will come wandering out and say, “I’m gonna fix this muscle,” but it encounters a whole lot of fat in the muscle, so it differentiates into an adipocyte instead of a muscle site. Remember, these stem cells are very plastic, they can take on a fate depending on the tissue they arrive to and what signals they receive. They’re local. It’s local as well as the global signals that are causing that. See, bodybuilders always knew, it was volume that built mass. I think this is really generally true, lots and lots of volume. Even two workouts a day, they used … I was around a lot of these guys.

Tim @ 57:21:
Sure.

Art @ 57:22:
I get the volume in a different way. I workout every day but maybe 20 minutes at the most, right? I do take one day, I don’t workout at all.

Tim @ 57:31:
What do some people in the Paleo movement get wrong? What do you think are the most common errors or logical fallacies, or damaging fads or trends that you observe in people who self-identify as Paleo?

Art @ 57:47:
Very interesting, because there are a lot of little tribes inside the …

Tim @ 57:53:
Oh sure, a lot of factions.

Art @ 57:55:
Frankly, I don’t keep track of these guys. There’re just too many people trying to say too many things. They eat too much fat. Absolutely true. A lot of them went off wildly into fat consumption, so they probably have fatty livers by now. I mean, really, you cannot eat large amounts of fat and not have a fatty liver. Who needs all the energy? They’re worried about energy balance. I don’t get worried about energy balance, do you? They think, there’re are particular kinds of foods they have to eat, but really, variety, and flavor, texture, color, that’s how you choose your meals.

Tim @ 58:45:
What are your thoughts on … I love your Facebook page by the way. I do have questions about why you got rid of your blog, but your Facebook has more information density than I’ve seen in almost any other Facebook page. What are your thoughts on coconut oil, and coconut products?

Art @ 59:04:
I wouldn’t do it.

Tim @ 59:06:
You wouldn’t do it. Now, does that come back to the fatty liver and just a percentage of your total intake as fat?

Art @ 59:13:
Well, first of all, it’s an evolutionary non sequitur, it doesn’t follow. You wouldn’t not be seeing large amounts of coconut consumption in the Paleolithic, so it’s just odd, first of all, and it’s kind of a fad, second of all. And then, who knows who are the manufactures of these things? They’re all signs of impurities that are involved. It doesn’t taste good either.

Tim @ 59:45:
I’ll confess, I’m pretty sick of the taste of coconut.

Art @ 59:49:
Modern meat has got so much fat in it already, why would you ever need to have any additional source of fat? Even olive oil I’m sparing with.

Tim @ 59:59:
Do you cook eggs, or do you consume eggs?

Art @ 1:00:01:
Sure.

Tim @ 1:00:02:
You do. How do you prepare your eggs?

Art @ 1:00:04:
Fried, boiled, scrambled.

Tim @ 1:00:07:
If you fry them, what are you using to fry in, or scrambled? Are you using a small amount of olive oil? Are you using butter? Are you using … ?
Art @ 1:00:16:
A small amount of olive oil and at a moderate temperature. I don’t know, I actually haven’t seen my wife cooking the eggs lately. I don’t know how she does it. Oil-free would be perfectly fine with me, if you had one of these ceramic pans, where things slide off. She never burns an egg either. They’re always wonderfully done. I used to throw a yolk away when I’d eat four boiled eggs, you know.

Tim @ 1:00:41:
Would you still do that if you were consuming eggs?

Art @ 1:00:45:
I find the yolk a bit odd in taste and I don’t like too much yolk, but I don’t throw ... But I get tired of eggs. I’m very tired, very quickly.

Tim @ 1:00:54:
Got it. Yeah, I love eggs, but I only recently discovered, a few years ago, and it’s so simple, how to make proper soft boiled eggs, so you have a nice delicious yolk, as opposed to the yellow golf ball of the hard boiled, which is just so chalky and unpleasant.

Art @ 1:01:15:
Yes, yes, eggs are ...

Tim @ 1:01:17:
Let’s talk a little bit about ... You mentioned the consumption of, say, post-workout carbohydrates and amino acids or whatever it might be. I’d love to chat a little bit about mTOR.

Art @ 1:01:31:
Yeah, yeah.

Tim @ 1:01:32:
This is a big subject, and a lot of people are trying to minimize mTOR activation, in the hope of extending lifespan and health span.

Art @ 1:01:46:
Yeah, mm-hmm (affirmative).

Tim @ 1:01:47:
I’d love, in general, to hear your thoughts on that, where people are, say, doing everything they can to minimize activation of mTOR. They’re trying to remove out leucine, they’re trying to get their IGF-1 as low as possible. So thoughts, in general, on mTOR and then also on the use of, say, rapamycin or metformin.

Art @ 1:02:09:
Well look, over-proliferation or hyperproliferation is considered to be one of the evils of modern world, but it was a necessary adaption in the past. You couldn’t have survived if you did proliferate rapidly in the presence of food, because you wouldn’t have another chance later on. You had to be very effective at doing that. In the evolutionary times, there would have been a protein quality control process following that, because you’ve had a fairly long interval without food.

Over-driving mTOR was never a problem. They’re talking, in the modern world, about people who never shut mTOR off. Basically, if you don’t have these intervals between meals, and you’re over-driving mTOR, so you’re creating lots of misfolded proteins, proteostasis is collapsing. The first thing
that C. elegans does, when it starts to die is, it's proteostasis collapses.

**Tim @ 1:03:08:**
C. elegans, this is our favorite worm ... ?

**Art @ 1:03:11:**
Yes, yes.

**Tim @ 1:03:12:**
For lab studies?

**Art @ 1:03:13:**
Mm-hmm (affirmative). So you don’t want your proteostasis to collapse. It’s not going to collapse if you have these intervals between meals. If you don’t turn mTOR, your immunity is not going to function properly, because you proliferate your thymocytes, and your T-cells. Your whole immune system ... Rapamycin is a immune suppressant.

**Tim @ 1:03:36:**
Immune suppressant, right.

**Art @ 1:03:37:**
Yeah. Because you’re shutting down mTOR. All toxins shut down mTOR, because you can’t transcribe in the presence of a toxin or you’re going to proliferate, that toxin is going to invade all the new tissues you’re making. Proliferation in mTOR ... And mTOR isn’t the whole thing, by the way. You stimulate mTOR through mechanical stress. When you’re consuming damaged proteins inside your cell, mTOR is being signaled. Why is that the case? Well, because those amino acids are now available. You have to have that, because if you don’t, the innate stress response can’t be activated. Gene transcription changes when you’re under stress. First of all, because you don’t want to make proteins in a stressful situation.

Second of all, you have to encode other genes to mount the stress response, and mTOR is doing that, because it’s getting the amnio acids that are coming from the proteostasis process. If they want to chronically turn down the mTOR, they’re going to waste away. You need IGF-1 to rescue neurons that are struggling and stressed. You make IGF-1 locally, not ... They’re confusing systemic IGF that is in the serum, in the blood, from the local. There’s local signaling and there’s global signaling, in some sense. In the circulation, you’re getting your global signals, but in the muscle or in the brain, when you activate ... when you exercise your muscles you actually create local IGF-1. It doesn’t necessarily go out into the bloodstream. I have very low serum IGF-1, but I have lots of muscle and it’s because I make it locally. I had an Olympic doctor who looked at me and said, “You can’t have that kind of muscle and have such low IGF-1.” I said, “Well, I make it locally.” Well, he’s used to seeing professional wrestlers and so forth, everybody stoking up on insulin and other such things, right?

**Tim @ 1:05:59:**
Well, it’s kind of like all the hipsters in San Francisco where they say, “Think globally, buy locally.” Well, so you’re thinking globally, and making your IGF locally.

**Art @ 1:06:09:**
I make it locally. But you know what? A muscle contraction will turn on AKT, and so you’re not coming through the insulin pathway but the second half of the ... you’re rescuing ... AKT is a survival hormone, survival protein. They’re thinking about the insulin pathway exclusively, but you got other factors down there. There’s some wonderful work done by the Japanese, Isomura, Akasaki and
others, who show that if you can over-express AKT in the muscle, that’s protein kinase B or whatever it is, yeah, it’ll heal your liver. So exercise your muscles, and heal your liver. How do you do that? You express AKT in the fast-twitch muscle fibers.

**Tim @ 1:06:58:**
In those studies, were these researchers using a high-intensity weightlifting protocol?

**Art @ 1:07:06:**
No, it was merely engineering the genes in a mouse to over-express AKT in the fast-twitch fibers. Profoundly, effective. Profoundly, effective. You can’t read that study … A series of studies by this group, Isomura, and you can’t read that without saying, “I want all the fast-twitch fibers I can have.” They’re not only disposing glucose, they’re taking the glucose disposal burden off the liver and off the brain. These insulin-like peptides that are signaling in the brain too often, you’re turning that down because you’re taking the glucose disposal burden off the other cells. Therefore, you’re reducing insulin signaling in those cells. It turns out that when you contract muscle, you make this 4-BepE or something like that, which interrupts transcription. What you want to do is you want to have … You don’t want to be transcribing new proteins in your brain when it’s not time to do so. You want to be improving the quality of the neurons. If you exercise, you reduce transcription in other cells because this particular protein it binds to mTOR and keeps it from initiating transcription, the things that mTOR does. mTOR is overrated anyway. It’s the ribosome that really matters.

**Tim @ 1:08:38:**
Please say more. Tell us more about the ribosome.

**Art @ 1:08:43:**
Well, the ribosome …

**Tim @ 1:08:45:**
Yeah, if you could make it as … Start at the basics. I could blame that on my audience, and say, “For those don’t know,” but I would actually like to educate myself.

**Art @ 1:08:56:**
Well, when you’re going to make a new protein, the messenger RNA comes out. It’s a string. The ribosome is this little bead-like structure that runs across the string and it’s charged with amnio acids. It reads the signals on the messenger RNA and it transcribes these long strings of proteins. Then they go off and then they’re folded and what have you. It’s actually like a universal Turing machine, remember?

**Tim @ 1:09:28:**
Sure.

**Art @ 1:09:29:**
Alan Turing said, “You can, you can make any computer if you just have a read/write head and a tape. That’s what the ribosome is. It’s the read/write head that runs along the tape and makes proteins. My neighbor at UCI was the world’s leading expert on ribosomes. God, it’s so complicated. He gives you a headache every time I’ve talked to him. I finally came up with this idea, well, it’s a universal Turing machine. It’s going across the … The read tape is the messenger RNA. The write tape is the protein that is made by the ribosome. Well, the ribosome not leaving very complicated, it’s very adaptive in what it transcribes. FoxO will change the transcription factors, so therefore change the messenger RNA. The ribosome will run across there. Between those two, they’re like any universal computer is inheriting what they can do. Your changing transcription factor, you wrinkle up the DNA a little bit and
expose other areas for transcription, and the ribosome is what is the coding factor that handles the integrated stress response. Protein transcription changes toward ... Instead of making new proteins, you're making these stress responsive factors. That's integral to the survival process.

**Tim @ 1:11:04:**
That happens in response to resistance training?

**Art @ 1:11:08:**
Yes.

**Tim @ 1:11:09:**
Got it.

**Art @ 1:11:10:**
Yes it does. You'll make FoxO, you'll alter the transcription of your DNA. You'll make new messenger RNA and the ribosome, if it sense stress in the cell, it'll begin transcribing these protective factors. Instead of making all new proteins it'll switch its ... Andrew Dillin has a wonderful paper on this, you should try to read. His group has taken the ...

**Tim @ 1:11:39:**
Where is he based? Or where is his team based?

**Art @ 1:11:41:**
Berkeley.

**Tim @ 1:11:42:**
Oh, that's Berkeley. Man, my backyard.

**Art @ 1:11:44:**
He's right up there in the Bay Area. He may be at UC San Francisco. He has a quantitative biology group there.

**Tim @ 1:11:51:**
In doing that, then in shifting the transcription to what you were just describing, to the survival ...

**Art @ 1:12:01:**
Yes.

**Tim @ 1:12:02:**
... or stress response ...

**Art @ 1:12:03:**
Stress response factors, right.

**Tim @ 1:12:05:**
... factors were bolstering that renewal program?

**Art @ 1:12:07:**
Yes.
The failure of which is implicated for what we call aging.

**Art @ 1:12:13:**
Precisely. Right. Your immunity is brought up also during this. Everybody who does anything in aging these days has finally agreed that basically it's the stress response, that that's what keeps you going. That maintains the cells, protects them and hormesis is … They want to leave it on all the time, but that would exhaust you. You can’t be posed for every possible kind of damage. Remember, the world’s full of maybe trillions of different kinds of damage that can happen to you and you can’t have a precisely tuned damage response to each threat. They have to be generalized. They're generalized through certain transcription factors and through the way the ribosome makes proteins. These generalized stress responses, they run across the immune system. They run across the stem cell system. They run across the protein synthesis, across the ribosome. All these pathways intersect and every one of them encodes some kind of stress response self-protective pathway that’s responding to a toxin, rapamycin, to a bacteria. The thing you don’t want to have happen is when a bacteria’s in there, you don’t want to be transcribing proteins that the bacteria will get into the … You’ll be making proteins for the bacteria. You’ve got to be able to shut down transcription at the right time, but you can’t shut down transcription or mTOR completely because then you can’t make the defensive factors that are required. This is where these micro-RNAs seem to come in.

**Tim @ 1:14:05:**
Are you interested or not interested in, say, intermittent use of something like rapamycin? Do you find that … Is that just trying to make a deal with the devil? Are there too many unknowns or is something like that interesting to you?

**Art @ 1:14:19:**
To me, it's a deal with the devil.

**Tim @ 1:14:22:**
Okay.

**Art @ 1:14:23:**
I haven't even had a cold in 40 years.

**Tim @ 1:14:24:**
I want to ask you …

**Art @ 1:14:25:**
I'm not going to mess with my immune system.

**Tim @ 1:14:28:**
Aside from, let’s say, the way that you eat and the spacing of your meals that we discussed, and the resistance training, what other factors or behaviors, interventions do you think have contributed to not being sick for decades?

**Art @ 1:14:44:**
Stay away from people.

**Tim @ 1:14:46:**
Stay away from people.

**Art @ 1:14:48:**
But I couldn’t, when I was teaching at the university, I had a class with 400 people in it and half of them had just gotten back from China and were coughing and sneezing, and so forth. I was sort of the universal substitute teacher because everyone else got sick, and they knew Art wouldn’t be sick. They'd call me up to go teach their classes. It’s spooky in a way.

Tim @ 1:15:12:
So do you … Is it just picking your parents wisely or is it is there more? Are there other factors?

Art @ 1:15:20:
There are other factors like if you expose yourself to some cold, you’ve stretched your muscle, you get plenty of good sleep, very important. And you got to have these FOXO, mTOR windows during your sleep. You’ve got to live in one window or the other. There is a growth repair window, Insulin window, and there’s the FOXO window. Insulin/mTOR versus FOXO. That’s how I see my life, and I’m going from one window to the other because you …

Tim @ 1:15:58:
Can you spell FOXO?

Art @ 1:15:59:
F-O-X-O, this is for a kid box. Proteins, they are for human version seven. FOXO… for supporting but it’s so important to use cognitive option. When you’re starving, FOXO makes you want to move.

Tim @ 1:16:20:
And so the FOXO window for you then would be part of good sleep, which is why you are not gonna eat within four or five hours of going to bed.

Art @ 1:16:28:
Right. You are going to spend the first window of sleep sort of rebuilding tissues. Second window of sleep you are into the starve FOXO mode, and you are also altering your synapses. There’s an interesting new gene that’s called Homer. It comes and it floods into your brain, yet when your excitatory starts signaling is depressed, not much glutamine in the neuron. So a Homer comes in and it shrinks your synapses.

Tim @ 1:17:03:
It’s very properly named, that’s hilarious.

Art @ 1:17:07:
It is hilarious and it’s proportional, shrinking. In other words, you are going to say 10%, each synapses is going to shrink by 10%. The biggest synapses are the most active ones. That’s where Post-traumatic stress lives. So if you can shrink those, they have to be stable, but if you keep rehearsing that same synapse costume, it’s going to grow in strength. And people who prefer varied thoughts in their mind or ruminate a lot, they get depressed because of those circuits. According to Gerald Edelman, that is Neural Darwinism.

Tim @ 1:17:46:
That’s Neural Darwinism?

Art @ 1:17:47:
Neural Darwinism, Darwin… there’s Darwinian competition going on inside your cells everywhere.

Tim @ 1:17:54:
So for those people listening who do ruminate and perseverate, that's another good word, constantly and get depressed, what advice might you give them?

Art @ 1:18:07:
Start off in exercise.

Tim @ 1:18:09:
Start exercise. You know what, you seem like you have more to say, so I'll let you. Please continue.

Art @ 1:18:16:
Well start with exercise but do something that's totally different so that you setup neural circuits that compete with the ones that are ruminating and building in strength in your brain. The starvation part of it is to eat up some of these dysfunctional synapses. My saying is for every damaged molecule there's a damaged thought. A depressed brain or a brain that has post-traumatic stress, those are injured neurons inside the brain and you just need to get rid of the dysfunctional molecules that are causing those neurons to malfunction.

Tim @ 1:19:01:
So I guess, yeah, of course, it seems self-evident that through those people it goes both ways, right? For every damaged thought, there's a damaged molecule. So if you are thinking about, rather than trying to think your way out of that problem …

Art @ 1:19:15:
Heal the brain. First heal the brain, and you heal it with neurotrophic factors as the outside on new thoughts, new patterns of behavior.

Tim @ 1:19:26:
How would you feed … and it sounds silly to ask, but how would you feed those new thoughts? If a loved one of yours was getting depressed and exhibiting new symptoms, what would you prescribe to them?

Art @ 1:19:38:
Well, you know, when my first wife was declining from a host of other things, I'd take her walking as much as I could. I would tell her bad jokes, and change the surroundings. You know, the typical things that people have to do. Being outside is enormously effective, there are stimuli you can't even relate to, but you perceive them. And your unconscious brain is what's gonna heal you first. And the unconscious brain is more healthy when it's exposed to nature, and happy people, and children, and dogs are friend of all.

Tim @ 1:20:20:
I think I'm getting this attribution right, but you said the first rule of conflict resolution or minimizing conflict is to not spend a lot of time around people who are constantly in conflict. I thought that was a good rule.

Art @ 1:20:38:
Well, our politics is exposure to that, so turn off the news. You must turn off the news.

Tim @ 1:20:44:
You mentioned in passing, cold exposure. So this is something that I found to be tremendously effective in mood elevation, and among other things. How do you expose yourself to cold?
Art @ 1:20:58:
Well, I walk with dogs early in the morning with almost no jacket or anything. I just go out and good to have some chilly with him. Cold showers and cold pool.

Tim @ 1:21:08:
And just to be clear, where do you live now?

Art @ 1:21:09:
Southern Utah, so it’s not as cold.

Tim @ 1:21:12:
It’s no longer UCLA around campus?

Art @ 1:21:14:
No, no, it’s not. But even though if you lived in a desert like climate, it’s cool in the morning.

Tim @ 1:21:20:
Sure.

Art @ 1:21:21:
Quite cool in the morning. I keep the pool cold, I don’t heat the pool much, and I take cool showers. I don’t try to shock myself.

Tim @ 1:21:31:
I know this may seem like a non-secretory which is most of my brain, but you were talking about what you taught Nassim, is it related to exercise? Are there anything … Any particular things that you’ve learned from him or … And that could be what you used his book to illustrate in your class or anything else?

Art @ 1:21:53:
Oh sure, I mean he … First of all, he’s a marvelous writer. He tells stories in a way I can never tell.

Tim @ 1:21:59:
Fat Tony.

Art @ 1:22:01:
Yeah, Fat Tony, right? He creates marvelous characters that embody the kind thinking he wants to ridicule or point out as savvy. He likes streets smart like I do, we both like math smart too, he actually he went to Courant Institute. He’s a very well trained mathematician far better than I. I guess we all need a Black Swan hunting device in some sense. Like I try to create a financial device. I have a Quick-pro a partner who’s to dumb to be able to take this anywhere but I’ve figured out ways to using kurtosis to finance pharmaceuticals and …

Tim @ 1:22:45:
Could you define Kurtosis, please and spell that for me?

Art @ 1:22:49:
It’s the measure of the odd shape of a distribution. It’s highly peaked and skewed off to the right or something. It looks very non-normal.

Tim @ 1:22:57:
It does not resemble a bell curve.

**Art @ 1:23:00:**
No, but it’s a thing of beauty, because it’s where life lives. That’s where life is in that kind of … There are fractal type distribution, so like a pareto distribution and then they drop down at the minimum.

**Tim @ 1:23:16:**
So you’ve revealed that for pharmaceutical development you said?

**Art @ 1:23:22:**
Yes, yes I have because the last talk I gave at Harvard was between what’s compared in the movies to pharmaceuticals. And it turned out that they were the same kind of statistical distributions. leptokurtic. It sounds like something you should gargle for.

But it’s actually a thing of beauty, it’s skewed and biased to the right and with a very long heavy tail. Heavy tail being, because every tail is long in a sense but they become very thin and has a lot of probability out there. That’s the truth of a power line distribution for any distribution and so forth. So it turns out pharmaceutical is that way, because a few pharmaceutical sell billions and billions and billions of dollars worth of like $12 billion a year. Most pharmaceuticals sell about half a million or a billion maybe at most.

It’s the big outliers that dominate the industry in revenues. So using that skew, you can design a swap like instrument that uses the upper tail to pay the lower tail. And if you divide it correctly, you have a very favorable kind of gamble.

**Tim @ 1:24:41:**
So his blood would times Black Swan hunting device then be through this derivvites trading? Would that be how or would it be something in addition to that?

**Art @ 1:24:53:**
Well, yeah, actually you are the one to talk about that because you are the guy who’s found all that Black Swans.

**Tim @ 1:24:58:**
With the startups, yeah, I mean that’s certainly … well, I mean the way… we are maybe going to get off the reservation here for a second, but the way I thought about that is … Because I do not have the mathematical or modeling background of you nor Nassim or anybody else. It’s not a funny story. It’s kind of a tragic story but tenth grade, my brother and I had two different math teachers. I had a math teacher who was very caustic. Really had a chip on her shoulder and berated students.

**Art @ 1:25:33:**
Sounds like Nassim.

**Tim @ 1:25:34:**
Well he would have a different response. I think Nassim is more pugnacious than I am so he showed his teacher. I decided to choose my college based on lack of math requirement. My brother had a fantastic teacher. He now has a PhD in statistics.

**Art @ 1:25:51:**
Isn’t that something. There’s an extreme event right there.
Tim @ 1:25:54:
Yeah.

Art @ 1:25:55:
It's a little small event but it really changed course.

Tim @ 1:25:59:
Yeah, it completely changed the course of my life and therefore in my case when I remember having a conversation with a hedge fund manager and there are plenty of bad hedge fund managers out there and I don't think they go by that name anymore, but there are some very, very brilliant people in the game. And I spoke with one, and I'm not going to get this totally right and do it justice, but he said there are a number of different advantages you can have and you need to have at least one. And he said an informational advantage. You can have an analytical advantage. You can have a behavioral advantage, meaning if you're someone like a … There are plenty of people who try to imitate say Buffett but they emotionally react to the market differently than a Buffett or a Munger.

Art @ 1:26:46:
Sure.

Tim @ 1:26:47:
And so on and so forth and there are many of these. And what I realized was given my sets of strengths and weaknesses where I could capitalize was in the informational advantage by placing myself in the center of the switch box in Silicon Valley so that became my way of hunting for black swans.

Art @ 1:27:04:
Fantastic. You can handle the information load that's coming through there.

Tim @ 1:27:08:
You know what's so odd about it in a sense or counterintuitive for a lot of people I describe this to and Nassim actually formed my thinking in a lot on this because and again I'm not going to do his description justice, but thinking in a barbell fashion where I have the vast majority of my assets and investments are cash or cash-like equivalents. And then I have the smaller portion that is speculative but very asymmetrical returns. If I can think through basic portfolio management properly. And what I realized for myself is that I have an emotional disadvantage when it comes to publicly traded anything.

I respond very poorly to compulsively despite knowing it's not in my best interest, watching people freak out and the sky is falling and then I become Chicken Little and I sell at the worst time. So what's fantastic about startups for me and I do not recommend this to anyone who does not have a significant advantage as I did, that I would do all of my homework, make a decision, invest and then I couldn't sell. It was a illiquid and that turned out to be a very good thing. I was locked in so I had to do all of my homework on the front end.

Art @ 1:28:25:
Yeah.

Tim @ 1:28:26:
And then there was no ticker tape for me to watch. No charts for me to watch really. And it's just worked out fantastically.
Art @ 1:28:35:
I had a professor who was long in sugar when the Castro revolution hit. He finally said I can’t take it anymore I got to clear my position.

Tim @ 1:28:45:
Oh man.

Art @ 1:28:47:
He couldn’t get any work done.

Tim @ 1:28:49:
Yeah, no, I’m really, really, really bad at anything that I can watch moving up and down so I need to address that in my own life in a lot of ways. So we were talking about, well for instance talking about the sugar position, I remember asking a friend of mine who’s a very good investor about liquidating certain positions or not. And he said, “Well I think you should just,” as I was asking him for certain dollar ranges, how he runs the math, and he said, “I just sell down to sleep at night level.”

Art @ 1:29:19:
That’s exactly it.

Tim @ 1:29:21:
So selling to sleep at night levels. And you mentioned getting good sleep. What are things that you do or don’t do to help ensure good sleep for yourself?

Art @ 1:29:31:
Well here’s probably the only supplement I take. I do take some melatonin.

Tim @ 1:29:36:
Melatonin.

Art @ 1:29:37:
Mm-hmm (affirmative).

Tim @ 1:29:38:
And do you take that on a daily basis?

Art @ 1:29:39:
Sometimes. I didn’t bring any with me on the trip or so forth. I don’t do anything regularly. But melatonin is much more than just a sleep aid. It’s found in plants. It’s a stress resistant protein. It does have powerful antioxidant properties but you need oxidants to… oxidative molecules are signaling molecules as well. But you need a proper balance of signaling versus chronically signaling oxidative molecules. But there’s some other direct, I think it stimulates autophagy in the brain or some of these more fundamental processes that maybe it brings out Homer.

Tim @ 1:30:28:
Out of his cave. How do you think about dosing? Is this like a 1 milligram? A 3 milligram? Do you have any idea?

Art @ 1:30:39:
Five.
Tim @ 1:30:41:
Five?

Art @ 1:30:42:
Sometimes ten.

Tim @ 1:30:43:
Wow. Okay. So that’s a dose that I would use if I flew to Hong Kong to correct my sleep cycle.

Art @ 1:30:49:
Sure you would. Yeah you would. And it would work but I don’t do it for sleep. I do it for the other things it does.

Tim @ 1:30:56:
Got it. And do you worry at all, and this has been, there are certain things you are not terribly interested in like rapamycin. Do you worry at all, and this is the question that came to mind, I haven’t asked him directly but Dom who we know, Dominick D’Agostino, also uses melatonin on a very, very regular basis. Do you worry about any type of negative feedback loop or tolerance development or side effects from chronic use of melatonin?

Art @ 1:31:21:
A lot of people do and maybe I did at one time when I didn’t know enough about it but actually it’s not… You’re not going to shut down the pineal gland from making melatonin because you’re not really stimulating it to make it in the first place. You’re thinking in terms of the homeostatic balance of melatonin. I’m not. I’m thinking about it as a surge that’s bringing up protective pathways. I think of it in a completely different way. And I don’t even take it to sleep. I take it to keep my brain…

Tim @ 1:31:59:
To summon Homer.

Art @ 1:32:00:
Yeah. To summon Homer right. Actually everything I think of I think in terms of those protective pathways, immunity, restoration pathways. The whole knowledge that I thought I had before is sort of out the window and you think in terms of these molecular pathways.

Tim @ 1:32:22:
I’d like to explore that a little bit and this is going to I’m sure uncover a fairly deep level of ignorance on my part. But if we’re thinking about … I know very little about melatonin but I have taken it in the past. If we’re looking at say the … I’m trying to frame this. If I think of the HPTA, hypothalamus pituitary testosterone access and the ways that that can be disrupted if you supplement with say testosterone or luteinizing hormone which I guess would be HCG when you’re injecting it or taking it some other form. Even if say testosterone, or growth hormone for that matter, are released in surges it’s not continual much like melatonin. Why wouldn’t regular consumption of melatonin cause some type of malfunction? I just don’t know if it’s one thing in a large stream of other elements that I don’t know about.

Art @ 1:33:22:
I don’t have any answer to that either. First of all you’re positing that there is a feedback…

Tim @ 1:33:27:
No I haven’t, no I’m not even positing, I’m just asking.
Art @ 1:33:31:
Yeah. So I wouldn’t necessarily posit that feedback pathway to begin with because I don’t think it’s a homeostatic balance there. I don’t think it’s that the body attempts to maintain pulses or a balance of melatonin. I think it’s … You actually make it during the day too. It’s not the sleep hormone. It’s a defensive hormone. I mean it’s in plants. Plants don’t have to get their rest or sleep. They’re not moving around all that much. It’s an ancient, ancient hormone. It’s evolutionarily conserved across almost all species. I used to know a lot about it. I haven’t thought about it in a while so you caught me short of knowledge.

Tim @ 1:34:18:
Maybe this is a good place to talk about the limits of human knowledge. For instance in reading the Black Swan Nassim talks about epistemological arrogance a fair amount. I think just to give people an example of that just to bring it down to a more easily understood level, a very good friend of mine … Well a lot of doctor says, any good doctor will generally say, “50% of what we know is wrong we just don’t know which 50%.”

Art @ 1:34:56:
Mm-hmm (affirmative), yeah. It’s so very true.

Tim @ 1:34:59:
How do you think about human knowledge what we can know versus what we can’t know and this very broad question but that was one of the topics that Naval recommended, bouncing around in this conversation. This is something that has caused me to go from taking a lot of supplements to taking fewer supplements, for instance, because there’s so many historical case studies of carrots are good for us. We think they improve eyesight. We attribute it to beta-carotene. Then, we start taking mega doses of beta-carotene. Oops.

Art @ 1:35:35:
Mm-hmm (affirmative).

Tim @ 1:35:36:
Turns out there’s a lot more to the story. Now we’ve created all these unanticipated side effects.

Art @ 1:35:40:
Yeah. I think even if you look at a static diagram of something like the mTOR pathway … Like, gosh, it’s so complicated. Then, you realize they all have to be in the right sequence, too, these molecules … Have to move at the right speed and have the right doses and so forth. You’ll never be able to figure that out. What you have to do is you have to be an experimentalist, maybe on yourself like you and I do.

Tim @ 1:36:09:
Mm-hmm (affirmative).

Art @ 1:36:10:
Maybe on your child or on your dog.

Tim @ 1:36:13:
On Molly.
I actually had to experiment on my child. I didn’t like to, but I had to because the doctors were killing him. I don’t want to get into that too much, but you have to be willing to test hypotheses. Why not just admit that nature knows a lot more than we do and try to live a simple, clean, decent life and eat good food and go hungry now and then, mimic those patterns? There’s an error-correction mechanism inside each one of us. If you err in terms of ... For example, you make some bad cells, some bad proteins, or some of your stem cells go bad, nature’s down there cleaning it up because the other stem cells will kill it. It’ll consume it, or it’ll shove it out of the niche just like eagles get shoved out of ... nestlings get shoved out of the niche.

There’s competition going on inside your body constantly and if you use competition to weed out the weak and the faulty and let the strong survive. Your ideas are competing, also. Everything is a question of variety, pruning, competition, pruning things. Like I said, God said, “I, I got these different species I’ll send out. Let’s, let’s see which one, which one is best, which one gets through the ice age.” That’s how you do it, and your body’s constantly pruning your thoughts, your motivations, your rewards, and sleep is the way you clean all that up.

**Tim @ 1:38:00:**
I want to shift gears a little bit. I’ll just ask some of what my audience knows as rapid-fire questions. Your answers don’t need to be rapid, but this has become the tail end of our chat. What books have you gifted most to other people or recommended most to other people? Are there any in particular that come to mind?

**Art @ 1:38:26:**
Well, I gave all my library books to the local college library, and they were full of books ... Not philosophy. I’ve thrown my philosophy books away.

**Tim @ 1:38:41:**
Why is that?

**Art @ 1:38:43:**
They’re pointless, empty questions, for the most part. They’re not testable hypotheses.

**Tim @ 1:38:49:**
Got it.

**Art @ 1:38:50:**
Yeah. I’ve been generous with my thoughts more than I have with my books in the sense I’ve gifted ... The bulk of my knowledge that I’ve developed on my webpage and in my first essay on evolutionary fitness and the knowledge I put out there about the paleo lifestyle, I think, was a real gift I gave to a lot of people who’ve carried on and developed it further. I wasn’t the originator, but Loren and I were both sort of thinking about ... Loren Cordain and I were thinking about these things simultaneously. I kept telling him, “Don’t jog, Loren. Don’t jog.”

**Tim @ 1:39:29:**
Yeah.

**Art @ 1:39:30:**
I think he probably still does, and I’m sure he’s quite healthy still. That’s the primary gift. I gifted many dissertation topics to graduate students. I’ve ran more graduate students at the universities where I work than anyone else in the department. The students were drawn to me, but my ideas were kind of complicated. So, there was not necessarily a good dissertation there in the usual sense.
Tim @ 1:39:59:
Good news? You have me as an advisor. Bad news?

Art @ 1:40:04:
It's a hard topic. Yeah.

Tim @ 1:40:06:
Are there any particular books that have very heavily influenced you? What are books that you've 
reread, if any come to mind?

Art @ 1:40:18:
I actually read the journal literature. I don't read very many books anymore.

Tim @ 1:40:21:
Got it. Scientific literature.

Art @ 1:40:23:
Mm-hmm (affirmative).

Tim @ 1:40:24:
Where do you go hunting for literature, and how do you decide what to read?

Art @ 1:40:27:
I choose a topic. I've looked very broadly at the topic from a mathematical point of view, from a 
biological point of view, which is all my reading now. I must have ... My bibliography is getting close to 
8,000 entries in this aging literature, and what a goofy literature some of it is, you know? I mean, 
there's some fantastic articles there, and then there's just a lot of fluff and redoing and reviews. 
Sometimes the abstract of the article won't be as long as the listing of authors. It's just really a weird 
feeling.

Tim @ 1:41:09:
It's just a party review.

Art @ 1:41:10:
Yeah. They've figured out how to get citations. Economists never ... We don't coauthor them much.

Tim @ 1:41:20:
Yeah.

Art @ 1:41:21:
Maybe one or two coauthors at the most.

Tim @ 1:41:23:
Well, I mean, if ... Humans respond to incentives, right? Got to...

Is that mostly PubMed? What sources do you like to use? Are you subscribing to particular journals 
themselves?

Art @ 1:41:41:
Well, I'm still a professor emeritus, so I have access to just about all the world's publications. Yeah.
Yeah. PubMed … I don’t get into reading about diets. It’s an endless literature and is pretty lousy.

**Tim @ 1:41:55:**
What are in the fields or field of aging, longevity, although I feel like that word’s kind of tainted, but-

**Art @ 1:42:03:**
Yeah, it is.

**Tim @ 1:42:04:**
Yeah. Life extension, that one too. I don’t even know what to call it, but what are the current wild-goose chases, in your opinion, or areas that are potential dead ends or things that are just getting way overblown, in your mind?

**Art @ 1:42:22:**
I do think these attempts to manipulate mTOR are kind of pointless. If you chronically shut down mTOR, you’re going to shrink to nothing. You’re not going to make new proteins. It’s windows. You’ve got to have these switches. The most fruitful papers that I read talk about a pathway that crosses another one, and they have switches. You turn them on and off. You age in this window. You don’t age in that window, is one way to look at it because-

**Tim @ 1:42:53:**
Yeah. Yeah, that’s a helpful way to look at it.

**Art @ 1:42:54:**
Yeah.

**Tim @ 1:42:55:**
You just want to have the not-aging …

**Art @ 1:42:56:**
Yeah. You want to be defending or renewing with … Most people in today’s life are renewing on a continuous basis. So, they’re misfolding proteins, and they’re damaging their cells and building fat in tissues where it doesn’t belong and so forth. I think all these attempts to stall mTOR are really kind of weird. You want to stall it if … You don’t want to overproliferate, but you actually want to be capable of proliferating when it’s essential. Because when you want to renew a cell or rebuild tissues, you have to be able to do that.

Bodybuilding and that whole notion of regularity and chronic are totally wrong. You’ve got to have switches, windows, and you go back and forth. You alternate. Alternating states is the way to think about things. The problem is some of the people have looked at … For example, Cynthia Kenyon’s work on the worms and so forth, the FOXO pathway. There are lots of residual pathways that are FOX, forkhead box genes that were part of the development process that are now resident in the cells and can respond and defend and repair a cell. For example, if you work out, you trigger FOXP and FOXM proteins in your brain. Well, they-

**Tim @ 1:44:22:**
By work out, you mean sprint or resistance training?

**Art @ 1:44:27:**
Yeah, you can jog if you want to, if you want to kill some of your stem cells. No, you got to have variety. You got to do all of these things. I think the idea of switches and windows is going to come …
Systemic signaling is the hottest new thing in aging research, which makes a lot of sense, that it's signaling at a distance. I think the stem cell pathways are going to turn out to be just crucial and very, very important. Again, mTOR is sort of misplaced. Because we have so many sick people in the world, it's bad to be average now, today's world. It's really bad. I've never had average looking tests in my blood work or anything else. Average is …

Tim @ 1:45:17:
Average is dangerous these days.

Art @ 1:45:19:
Yeah.

Tim @ 1:45:20:
You mentioned, so “dangerous” reminded me of one thing that you said in passing and I wanted to just unpack it. It may not be a long story but you said, “I've never been injured in all these decades of weight training except for one instance that I can remember.” What was the one instance? What happened?

Art @ 1:45:39:
Oh man, it was just this weird guy in the gym.

Tim @ 1:45:42:
There are a lot of those.

Art @ 1:45:44:
Yeah, I was going to say … He was a fireman, and he worked out at the gym. He used to do these behind the neck presses.

Tim @ 1:45:55:
Oh right, with the barbell.

Art @ 1:45:56:
Yeah, with a barbell. He's using some weight, and I said, “Well, that's nothing.” I wasn't warmed up or anything. I hopped on. I said, “Well that's easy,” and I did it and I pulled a muscle in my neck and it hurt for three months.

Tim @ 1:46:10:
What are things that you do to help minimize the likelihood of injury, whether it's some type of warm up before you go into your negative work or otherwise?

Art @ 1:46:24:
Well first thing, I don't warm up.

Tim @ 1:46:26:
You don't warm up?

Art @ 1:46:28:
No, like Mike Mentzer used to do just go in and start working out. Now, when I was …

Tim @ 1:46:33:
You go straight to your first work set, whatever that might be?
Art @ 1:46:35:
Yeah. It's usually sort of mild, and I may start with my so-called famous hierarchical sets, a light weight, 15 reps, heavier weight, 8 reps, a heavier weight yet, 4 reps. You're going right up the fiber hierarchy, slow, intermediate, fast switch. Now you're warm. You warm up more rapidly if you do something that is reasonably intense and then the rest of the work out you're warm. I work out early in the morning when it's cold, or I used to, but now that I don't have a job anymore, I'm retired. I work out at 11:00. Every time I go there I see the same guy. He's an ex-bodybuilder, you can tell. He looks good. He still, he's there for hours. I'm in and out. I don't know who looks better. I think I do, but I'm leaner. He's more bodybuilding looking guy. They don't look good. When they're not flexed, they don't look good. Let's face it.

Tim @ 1:47:37:
You mean you don't like the second trimester abdominal look?

Art @ 1:47:41:
No.

Tim @ 1:47:42:
Just for all the bodybuilders in the audience, it's not all of you, but let's be honest. If we look at some of the competitors when they're not flexed, oh boy how long, you know. Is it a boy or a girl?

Art @ 1:47:54:
That's right. That's exactly right. I'm there for a little adventure, for a little bit of intensity, not go get hurt. If you have long muscles, if you've a full range of motion you're not going to get hurt.

Tim @ 1:48:08:
You're also generally, at least on the negatives, following a slow cadence. You might be raising it quickly but you're lowering it entirely under control.

Art @ 1:48:19:
Control, entirely under control but down to a full stretch.

Tim @ 1:48:22:
Right.

Art @ 1:48:23:
I'm thinking tightened spring. There's a spring down there, so even if I'm doing positive exercises, I will lower and I'll come, and I'll do a little, not a bounce because full stop bounces are destructive, but the little stretch bounce.

Tim @ 1:48:41:
Right. If you were to go back to teaching, and you were to teach a freshman undergrad, actually it could be a freshman or a senior seminar, so just a say 15 to 40 students, something like that, and you only have them once a week. Let's say you have them once a week for 3 hours, one semester. What would you teach them?

Art @ 1:49:06:
The economics of uncertainty. That's the last class I developed there at UCI and I taught it. They loved the class. The economics of extreme events is really what it was. Not uncertainty the way it's taught by utility theory and all this nice utility maximization and expected this and expected that. It's all
nonsense. It would be the economics of extreme events.

**Tim @ 1:49:31:**
If someone wanted to, since you're probably not going to teach that class anytime soon, if somebody wanted to explore that for themselves, how would they self educate? Any starting points that you would recommend?

**Art @ 1:49:45:**
My class notes are somewhere.

**Tim @ 1:49:47:**
You should definitely somehow crowd fun getting those.

**Art @ 1:49:52:**
Well, I would start with my movie book.

**Tim @ 1:49:54:**
What was the title of that?

**Art @ 1:49:56:**
Hollywood Economics. It covers extreme events fairly thoroughly. In fact, a lot of students looked at that. I had other readings as well, or you could look at Climate Science and look at the extreme climate theory. Extremes of climate fire variation, and what happens you could look at the economics of storms and floods, flood plane analysis. I would look at nature.

**Tim @ 1:50:27:**
If you were to pick one of Nassim's books to start with, would you choose Fooled by Randomness, or would it be one of the others?

**Art @ 1:50:36:**
I think students learn more from Fooled by Randomness. The Black Swan is marvelous as well. Skin in the Game is probably going to be a terrific book too because you've got to have Skin in the Game. Everybody knows that but they always ignore it. You want to do a Chinese fun, you've got to put skin in with him, 30%…

**Tim @ 1:50:58:**
They want incentives a lot.

**Art @ 1:51:01:**
They won't just cut your knuckles off.

**Tim @ 1:51:03:**
There's more at stake. The economics of extreme events, if you could put anything on a billboard, you have a gigantic billboard and you can put a short message, a word, couple of words, sentence, whatever, to get out to millions of people, what would that message be or whatever you would put on the billboard, could be anything?

**Art @ 1:51:30:**
Well, I used to, in my principles of economics, teaching the importance of freedom in arbitrage, arbitrage keeps you from being stupid because you compare the price of this relative to other equivalents or close substitutes or so forth. If you talk mathematically about pricing, you lose the
anchoring from the arbitrage principal, so I always taught arbitrage.

**Tim @ 1:52:00:**
Arbitrage, could you explain that maybe through an example? I would just love to hear …

**Art @ 1:52:05:**
Yeah well, buy low and sell high but you trade. You have to trade different alternatives. For example, nature abhors a vacuum and economics abhors an arbitrage opportunity. Arbitrage opportunities get eliminated.

**Tim @ 1:52:22:**
Is that, okay got it but is that just efficient, not efficient market theory.

**Art @ 1:52:27:**
It’s a sensible way of looking at efficient markets. The best predictor of tomorrow’s price of something is today’s price because that leaves no arbitrage opportunity. If you knew the price is going up tomorrow, it would go up today, that kind of thinking. You think about opportunities but you think in terms of the arbitrage limits that are there.

I taught general equilibrium theory as arbitrage also. It wasn’t too successful. It wasn’t appreciated but this is how [Malenvow] taught general equilibrium theory also, the presence of arbitrage.

**Tim @ 1:53:06:**
Would you just put understand arbitrage? Would that be the message?

**Art @ 1:53:12:**
Oh the billboard?

**Tim @ 1:53:13:**
Yeah.

**Art @ 1:53:14:**
No, it would be freedom counts.

**Tim @ 1:53:18:**
Freedom counts.

**Art @ 1:53:19:**
Yeah, freedom matters.

**Tim @ 1:53:21:**
Is that mostly in reference to markets or is it …

**Art @ 1:53:25:**
Freedom of contract, freedom of arbitrage, freedom of entry, freedom of exit. People don’t have to be forced to do things. They can exit. They can participate.

**Tim @ 1:53:36:**
Freedom counts.

**Art @ 1:53:37:**
Yeah.

Tim @ 1:53:38:
I like that.

Art @ 1:53:39:
Workouts too.

Tim @ 1:53:42:
Lift heavy things.

Art @ 1:53:45:
Yeah, lift heavy things. Freedom counts.

Tim @ 1:53:47:
Well Art, we could talk for hours and hours and hours. Then we're going to go probably grab a bite to eat at some point after this, but is there anything, and I'm going to ask you after this where people can learn more about you, what you would like them to check out, and certainly that will all go in the show notes, but is there any, or a parting words or suggestions, or asks of my audience, something they should test, something they should consider, anything that you would like people to …

Art @ 1:54:19:
Get ready for my book when it comes out on aging. It's a field that's full of a lot of charlatans. There's some good science and there is no such thing as successful aging because aging is damage, so you can't be successful if you're being damaged.

Tim @ 1:54:37:
Do you have a set timeline for that or a title people should look out for, or should we just say, “Prime yourselves, it's coming and we will let you know when it comes out.”

Art @ 1:54:47:
Yeah, just check my Facebook page. That's my … I've given up my blog. It wasn't worth the time and effort. I did help a lot of people but I'm past that now. I've taken up this as really as a scientific quest because one, like I said, I'm experienced, coming up on aging, on 80. You start thinking about when you first approach middle age you start thinking about these things.

Tim @ 1:55:15:
Now wait, so you're planning your next 80?

Art @ 1:55:18:
The possibility, the technology is coming and it is there right now, inside each person, and it's the protein quality control, self quality control. Don't lose cells. Maintain them, starve them once in a while. That's good for them. If the technology, I am applying the technology and I think I'm doing pretty well at it so far. I do plan to live another 40, 60 years.

Tim @ 1:55:46:
I think you're doing pretty well and your arms are bulging out of your shirt, which is long sleeved, so I think things are going well. Art, thank you so much for the time. I really appreciate it and this has been a lot of fun. For everybody listening, as always, you can find links to everything that we've discussed, to Art's Facebook page and more at Facebook, not Facebook. Let's try that again, at fourhourworkweek.com/podcast, or at tim.blog/podcast. They both go to the same place and you can
find show notes for this episode and every other episode, and until next time, thank you for listening.