It's Rainmaking Time - Energy-Protective Materials (June 2014)
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http://itsrainmakingtime.com/_radioshows/140602Peat.mp3

Ladies and gentlemen, welcome to It's Rainmaking Time.
This is Kim Greenhouse and it's an extraordinary honour to welcome Dr. Ray Peat who is an expert in the areas of naturopathic medicine, in nutrition and physiology. He has a PhD in Biology from the University of Oregon and he specializes in physiology. He has taught at the University of Oregon, Urbana College, Montana State University, National College of Naturopathic Medicine, Universidad Veracruzana…..OMG I don't know if I am pronouncing that right…..and the Universidad Autónoma del Estado de México and Blake College.
He has written about anti-aging. He has written about the effects of hormones from oestrogen, progesterone, DHEA. He has written about radiation, stress, and lack of oxygen. Recently I'd just found out that he'd written about water, some of the misunderstandings about water. He has articles and papers on cancer, on hot flashes, multiple sclerosis, on meats, fats, functions and malfunctions. It goes on and on. He feels there needs to be a new perspective on living matter.
If we actually had a different kind of perspective we would understand that energy and structure are interdependent at every level.
That's what he says. Ladies and Gentlemen, welcome the honourable and incredible Dr Ray Peat back to It's Rainmaking Time. Good afternoon.

RP: Thank you. If people want to get a perspective on what that means, a new attitude towards what life is, the works of Albert Szent-Györgyi and Gilbert Ling are the best places to start I think.

KG: Let's do a little bit of a context for the listeners about a new perspective on living matter. Flesh that out for us, talk a little bit about it.

RP: It probably got its best start with the biochemist Bundenberg de Jong. He demonstrated that compositions of fat and protein and carbohydrate made things much more complex than colloids. He called them complex coacervates. They had many of the functions of living cells and then Sidney Fox, a generation later, demonstrated that he could create things like cells so simply that his students could create replicating cells that had many of the functions of bacteria in just an hour, or two-hour afternoon lab. He would throw amino acids on hot lava, imitating a prehistoric situation and then splash a little water on them so that he was creating from a dry environment, in which water was under the control of protein or of amino

acids, rather than in a wet ocean-like environment. And he showed that in this relatively dry condition, the water and the amino acids catalysed themselves to form protein-like molecules which spontaneously formed little spheres about a micron in diameter, very uniform, and that these things would assimilate other proteins from the environment and grow and bud, like yeasts replicating. The buds would grow and assimilate more proteins and so on. They simply lacked nucleic acid to resemble living bacteria, and then he showed that adding the precursors to DNA, these things would catalyse polymers of DNA-like material. So spontaneously he showed that simply by not overwhelming the molecules with too much water – that the water was an essential part of organizing proteins and DNA-like material – and that the very stable spontaneously forming structure resembled bacteria.

KG: So, what does that mean to us in this context of a new perspective on living matter? What does that mean, what you just said?

RP: Well, when you look at the substance of a cell rather than having to be assembled through a billion years of evolution, it means that the principles governing the way we function also govern the way the organism holds itself together or forms itself, makes new cells and rather than a cell being isolated from the environment by a lipid membrane – the famous bilayer lipid membrane – the functional principle is what Bundenberg de Jong demonstrated, was that these complex mixtures of protein, fats and carbohydrates primarily, spontaneously separate things from the environment and cause their chemical change and integration. So that, for example, if you take a piece of hair made up of completely dead cells and wash it completely free of all of the sodium and potassium and calcium ions and so on, then you dip it into serum, it will pull out the potassium and bind potassium to itself against a gradient excluding sodium. It will bind magnesium excluding calcium and so on. So this demonstrates that you don't need membrane pumps. It's simply an ion exchange phenomenon that dead cells can do and this is behind the way of looking at matter that Gilbert Ling, Bundenberg de Jong – these non-mainline researchers – I think of it as the *real* mainline of science and that the 'membrane school' is the peripheral, irrelevant part except that they are more numerous.

KG: So that's the big paradigm change in the way we understand the cell. You're saying there's so much even about hydration that's said that you have to get through the membrane of the cell to hydrate the cell. Do you agree with that?

RP: I agree that that's the paradigm, but that's been totally disproven so many times. The idea of the membrane is that the arrangement of chemistry inside is unstable relative to the outside, and this whole idea that we are negentropic and that entropy tends to kills us tends to make everything die. This view is that we're a stable form of matter as long as energy runs through us and that it's a chemically favoured arrangement of matter that doesn't need pumps in the membrane to maintain it, simply the composition which maintains itself.

KG: Is what you're saying the cell's a self-maintaining organism?

RP: Yes.

KG: OK, versus needing things from the outside?

RP: Yeah, the whole idea of the membrane and the pumps is based on this idea that it's an improbable, accidentally-arranged thing that came about only by extremely improbable events over a billion years. The fact that Sidney Fox could make cell-like things in a couple of hours shows what a different perspective it is on the nature of substance.

KG: Here's my question. You know how there is a lot in science now about cell hydration? What is your view on cell hydration?

RP: Gilbert Ling, just sort of incidentally to his main work, has demonstrated that hydration is regulated by energy. The amount of energy the cell is producing and holding prevents the cell from taking up too much water, but it binds water and prevents its loss below a certain level and so if you lose the adequate amount of energy, the cell controls the water, the water starts to take over and control the cell. This explains many medical problems involving oedema and swelling that the membrane theory is totally confused about. Doctors will tell you to stop eating so much salt to reduce your oedema, but in many situations restricting sodium is exactly the wrong thing. It will make the oedema worse, especially in premenstrual women and very old people. I've seen people solve their swelling problems, their high blood pressure problems, appetite control and so on just by salting their foods according to what tastes good, rather than what the doctor advises.

KG: Dr. Peat, I have dear friends of mine that have high blood pressure, and I tell them to take real salt and obviously not just the regular salt on the table, but they say their doctor tells them "do not have salt at all".

RP: Yeah, and a lot of doctors still tell people to drink two quarts of water even disregarding whether or not they might be drinking milk, coffee, orange juice and so on and there are experiments that show that if you put a little too much water in the intestine, it will promote inflammation. A little beyond that and it can start causing a shock reaction. Loss of sodium tends to be associated with imbalance of several other salts, but sodium itself stimulates energy production of the cell and respiration and if something interrupts that balance of salt, magnesium and calcium and the cell loses energy, the cell takes up too much water and the excess of water stimulates cells growth, but not energy production. That tends to create an anabolic condition with all sorts of possibilities, including diabetes, obesity and cancer, inflammatory things in general.

KG: You know how there was a guy who got the Nobel Prize for identifying the aquaporin channel in the cell?

RP: Yeah, Gilbert Ling has written quite a bit about the whole channel idea.

KG: What do you think about it 'cause I haven't read Gilbert Ling yet?

RP: Since Ling explains the balance between proteins and water adequately to take care of everything and the channel idea goes with the idea of a membrane – which is a barrier to salts and water and so it needs channels – but Ling demonstrated that there is no such barrier. There might be something that you can stain that looks like a membrane. With different preparations, you get different membrane appearances, but there is no barrier to sodium entering the cell and as soon as isotopes became available in the 1940s, it was discovered that sodium clearly leaves and enters the cell but there is no semi-permeable membrane keeping sodium out.

KG: What about keeping water out?

RP: It's the same thing, if you have a fat layer which can keep sodium out and potassium in that would obviously be keeping water out. One of the early persons criticizing the idea of a lipid membrane — it was being described as basically a lecithin membrane made out of phospholipids with their fatty acids stuck together in the layer — he commented that lecithin has a great affinity for water and it will swell in the presence of water so it's a very bad choice for postulating as the limiting membrane barrier on the cell.

KG: You talk about the distinction between water and ions, that we need to really understand more about the play of water in ions?

RP: The thinking is partly sustained just because some of the methods [are] becoming so complicated that doctors and researchers use approximations and don't really calculate what's going on with ions and pH and so on. And a lot of that derives from what the definition of an Acid is and what a Base is. Gilbert Lewis defined acids in a very different way in which protons aren't involved. The whole medical idea of Acid and Base involves the concentration of protons. That's what pH stands for. Gilbert Lewis demonstrated that you don't need protons at all to have Acids or Bases. It's all a matter of how the electrons are handled and since electrons are what are involved in metabolism and energy production, it's much better to use his concept of Acid-Base rather than the proton pH idea. Peter Stewart redesigned the handling mathematics for Acids and Base and he showed that almost always the crucial factor is CO2 gas pressure, not the bicarbonate ions that hospitals are measuring and calculating. It happens to be that Peter Stewart and the Gilbert [Lewis] Acid Theory are simply physically correct. And Gilbert Ling doesn't talk about these particular aspects of the theory but his way of calculating ion distribution is so physically simple and correct that some of the first people to accept his calculations were the engineers designing water softeners and ion exchange resins because his calculations work perfectly for any physical system, not just cells.

KG: Would you talk a little bit about CO2 because since 2009 and since the EPA declared war on carbon dioxide (CO2) and since the whole global warming thing and anything connected to climate changing, people are scared to death of CO2. And I

just realized in doing an interview with Dr Mark Sircus that oxygen isn't everything in fact, if you don't have enough CO2, you're not going to be well. There is a lot of confusion about this. Explain what CO2 is and what does CO2 have to do with aging and heath?

RP: About 60 years ago, some people working with microorganisms did a survey and found that although some bacteria, protozoa and so on can survive without oxygen like in deep sea vents, there are organisms that totally live without oxygen and use sulphuric acid as their oxidant for example. These experimenters tested many different types of organism and even those which can live without oxygen can't live without CO2, so it really should be considered the basic material of life, not oxygen.

The purpose of oxygen from that point of view is to make CO2, and if you consider it in the context of Gilbert Ling's cell structure, with the protein itself is a weak acid and the weak acid is electrically charged with a negative charge which attracts positive ions so that it spontaneously binds things like potassium, sodium, magnesium and calcium. But if you adjust the composition as a whole, the whole colloid or coacervate of the cell, the water softener prefers to bind calcium over sodium, but if you put a very high concentration of salt through your water softener, you can wash out the calcium and then it will extract calcium from your hard water because of its chemical nature and the acidic group of the right size will prefer one ion over the other. And CO2 is one of the factors that cause our proteins to prefer potassium over sodium. At the same time that the cell is regulating its salt and ion balance by having the right amount of CO2, it's producing a steady stream of CO2 flowing out of the cell into the blood and as it leaves the mitochondrion, it reacts with water forming carbonic acid. And the carbonic acid has a negative charge so as it flows out of the cell, it drags along positive ions with it in this case, calcium and sodium are constantly flowing out of the cell just because of the flow of CO2 and, as we exhale that carbonic acid in the blood, is constantly changing back into CO2 – which leaves in the lungs and that leaves these calcium and sodium ions stranded in the blood as the C02 leaves them – that accounts for the blood having a more alkaline test pH equivalent than the inside of the cell. Then the kidneys finish keeping the balance again, by adjusting the change between C02 and carbonic acid allowing the kidneys to select in one direction or the other these ions.

One of the functions of C02 is to regulate the acidity of tissues and prevent the uptake of too much water and to keep the energy intake going. Shock is a typical extreme situation, in which cells become unable to make energy and take up too much water so that for example, your capillaries take up water and can swell shut. Cells become so fat they close the aperture. Arterioles get swollen so that blood hardly passes through them. The mechanisms obviously relate to the known mechanisms of shock except that the shock industry is committed to the idea that something fails in the circulatory system as a primary event but not necessarily the closure. Simply the heart stops pumping enough maybe because the blood vessels have relaxed too much and can't return the blood but they neglect the fine structure of what's really happening?

In the early part of the century, Yandell Henderson, a Yale professor, became interested in CO2 physiology as a regulator of oxygen metabolism. Shock at that time was being seen in relation to the nervous system as something that can turn off or turn on energy production of cells all through the body, but he was simply looking at what happens with more or less CO2. And in one of his studies published in 1910, and another one in 1911, on what happens to the circulation in the absence of CO2, he was one of the first people to see that CO2 relaxes the arterioles and allows blood to flow freely through the body but if you turn off the energy production and stop producing CO2, then you have less relaxed blood vessels, the heart has a harder job pumping. So he was looking at the feature of shock that fails to return blood to the heart and fails to pump it. The First World War – all of that research relating to the chemistry of metabolism and how it relates to the function of arteries, capillaries and veins and the heart – all of that was displaced by a simple mechanical failure of the blood to pump without explanation of the mechanism behind it and that elimination of CO2 metabolism became institutionalized as hospitals simplified things by supplying oxygen in an emergency where Yandell Henderson showed that you could cause quicker recovery of oxygenation by adding 8 or 10% of CO2 to your oxygen. The whole idea of physiology changed largely as a result of the war research.

At the time of the Second World War a Russian researcher, who was looking at the appearance of high metabolizing animals in the world – how the expensive energy producing brain of humans could evolve, what the factors in the environment are that are needed to maintain and develop a brain – he saw that the environmental CO2 is an essential factor for good brain function and he predicted that the natural development of the planet's ecosystems would be to increase the metabolic rate, increase the brain size of populations, and do it by the interaction of increasing CO2, stimulating O2 metabolism and stabilizing the big brain. And in the history of the deposition, the carboniferous age of fossils, for example, at that time when evolution advanced so rapidly the amount of CO2 in the atmosphere was many times higher than at present, so he predicted that the earth would go through other phases of greatly increased atmospheric CO2, that would increase the whole vitality of life on the planet. Vernadsky died around the end of the war in 1945 or 46 but around 1970 a Russian researcher looking at the length, birth weight and head size of babies born over a period of decades saw that around the world the head size had been increasing in correspondence to the increasing CO2 in the atmosphere, seeming to validate the prediction of Vernadsky made 25 years earlier.

KG: What does that mean?

RP: That we don't have to worry about increasing the atmosphere because it's stimulating life at all levels.

KG: Can you tell that to the EPA because the EPA is acting as a police agency and an entire industry is created to decrease CO2?

RP: Yeah. But if you think of CO2 as a life supporting, brain supporting thing…

KG: Well, I do, actually. I had Dr. Sherwood Idso on to do a whole show on CO2 with regard to plants and life itself, but you're a whole other side to it with health.

RP: Going to a high altitude is one thing an individual can do, changing the diet to include lots of fruit, anything that supports thyroid function, avoiding PUFAs, avoiding electromagnetic fields, and so on.

[Quick radio break (omitted)]

KG: Do you agree that if we got more CO2 in our systems that we would be healthier?

RP: Up to a certain point. The insurance industry, more than a 100 years ago, recognized that all of the degenerative diseases cause less deaths at very high altitudes. They had figures from all over the world at the beginning of the 20th century showing that cancer, brain diseases, heart disease, all the circulatory diseases caused many fewer deaths at altitudes of 8,000 to 10,000 feet.

KG: Why do you think that is?

RP: Well, Yandell Henderson, a professor at Yale in the early part of the century, did most of the basic human physiology relating to CO2. He showed that oxidation of the tissues depends on CO2 and if you have too much oxygen in your environment, which at sea level we do have, that reverses all of these ion balancing processes and energy giving processes and pushes too much CO2 out of our blood when it reaches the lungs. That shifts the whole balance so that as the blood reaches the cells carrying its load of oxygen, it requires the CO2 being produced in the cell to release the oxygen to the cell and if your whole system has been depleted beyond a certain level of the necessary CO2, your red blood cells don't give up enough oxygen to the tissues and so your will starve your peripheral tissues. If you hyperventilate for a couple of minutes, breathing deep and fast, you will notice that maybe your fingers and toes go into a cramp. That same process happens under any circumstance that is depriving you of CO2. Giving pure oxygen, 100% oxygen, will create the same situation and in the brain too much oxygen and the deprivation of CO2 shrinks the blood vessels so that just a couple of years ago using MRI and other imaging they have shown that too much oxygen breathing lowers the availability of oxygen in the brain by constricting the blood vessels.

KG: Fascinating. So what would you suggest for the listeners to get their CO2 levels up? I notice you brought up the breathing method of Buteyko, the Buteyko method. Isn't that a Russian breathing method?

RP: Yeah. He was a Russian doctor who, starting in the 1950s, noticed that sick and dying people tended to hyperventilate and he found that if he could calm them down and get them to breathe more slowly they often recovered. I don't think he was aware of the research that Yandell Henderson did. Henderson got the emergency fire fighters and such – from the 1930s and 1940s, it was standard to use

8% or even 10% CO2 in the respiratory tanks with O2 to treat suffocation victims, carbon monoxide poisoning and such because CO2 is so essential to restoring respiration and it even activates the Krebs cycle. I personally think it's involved in the actual formation of ATP from ADP by facilitating the dehydration withdrawal of water from the phosphate precursors to form the ATP itself.

KG: So what do you suggest for people so that they get more CO2 in their system?

RP: Diet is very important, some foods interfere with metabolism, cause you to tend to produce lactic acid, which displaces CO2.

KG: Let's talk about that.

RP: PUFAs block respiration and thyroid function. Alkaline acid balance is another thing that tends to make you blow out too much CO2 and not form enough.

KG: Don't you find, Dr. Peat, that's very confusing for people? This man that I interviewed years ago who's passed on now, David Webster, who did a huge amount of research for like 35 years on the colon. One of the things he said to me is that people talk about pH, but there's blood pH. The colon has a totally different pH. There's different pH's in the body, so how do we not get it all confused?

RP: If you think of the flow of CO2, for example, the healthy cell producing a lot of CO2, which is a Lewis acid – it contains no protons but it has an acidic reaction all by itself – it being formed, and oxygen which forms it. Oxygen is named as the acid former, the acid that it forms is in the cell CO2. So the function of oxygen is to make the carbonic acid, which gives the cell in its healthy condition an acidic reaction below 7pH. When it gets sick and can't make CO2 – as in cancer – the pH of the cell becomes alkaline. But in the healthy condition, you have inside the cell a mild acidic condition, as the CO2 drags minerals out of the cell and drops them in the blood, the blood becomes alkaline. But as the urine retains the alkaline minerals that it needs – the right balance of calcium, magnesium, phosphate, sodium and potassium – the kidney ideally should be producing acidic urine to maintain that alkaline blood stream.

KG: So, when people are measuring there alkaline-acidity balance with an alkaline piece of paper and they are testing their urine, it's not giving the right reading, is it?

RP: No, you want your blood to be alkaline and to do that your urine ideally, usually is on the acidic side and people with alkaline urine, tend to deposit minerals just because of the physics of the situation.

KG: I hope the audience understands this because it can be a little bit confusing. Say it again, would you, Dr. Peat?

RP: OK, the kidneys are very important along with the lungs in maintaining the alkaline normal condition of the blood stream. And to do that your lungs blow out

the acidic CO2, and your kidneys according to the need, they can adjust the pH but the most stable situation is for the kidneys, like the lungs, to excrete a slightly acidic material.

KG: What do you think about hyperbaric oxygen chambers that cancer patients have gone into to try to get rid of the damage from radiation and chemo?

RP: If the circulation is completely destroyed to an area as in gangrene, high pressure oxygen can get the tissue; keep it alive by diffusing into the tissue. So, for like a wound, a puncture wound, with damaged blood vessels, high-pressure oxygen can help it recover. But the situation in the brain in which too much oxygen shuts down the blood vessels, the oxygen is actually preventing proper delivery of oxygen to the brain. I knew someone who was treating cancer patients with high-pressure oxygen – I think 200% of normal pressure. He tried adding some CO2 to the atmosphere inside the chamber and he got a little too much in and the patient lost consciousness. He hadn't been able to speak at all because of cancer in his throat, but he was unconscious in the machine for a while as the person tried to remedy the excess CO2, and during that time the windows steamed up and so that the doctor couldn't see what was happening in the chamber.

KG: Doesn't sound like a very stable scenario.

RP: Very scary situation. When he finally got the pressure down and the chamber open, the person was recovered as his CO2 went down. He woke up and he could talk.

KG: What does this mean?

RP: The bedding he had been lying on was soaked, he was almost floating in water from perspiration and his breath had produced so much vapour that it plugged up the windows. The CO2 basically improved the acidity of his cell proteins, so that they could excrete the water. In the cancer situations, cells lose their CO2 production and with the low energy become waterlogged, soak up too much water and can't do anything but grow. So apparently the CO2 helped his cells to excrete the water very fast, so it was just pouring out of all of his pores and through his lungs and kidneys and he could talk normally and he felt very good when he woke up.

KG: So what should we do to enhance our CO2 experience and get more of that into our cells and our blood?

RP: Living at an altitude of 11,000 to 12,000 ft. probably the simplest thing if you can do it, but otherwise it is a complex matter of improving everything that's relevant. Butekyo found that just by behavioural assistance, coaching them to breathe more calmly and shallow, slow breathing, he could do it. But the stressful environment makes people hyperventilate. Chemicals in the environment, estrogenic materials stimulate hyperventilation, oestrogen pills of all sorts increase hyperventilation and imbalance the blood, minerals and so on.

KG: Would you talk a little bit about the distinction between progesterone, pregnenolone and oestrogen, just in terms of giving a frame of reference to the public?

RP: Oestrogen is essentially anti-oxidative and anti-thyroid. Thyroid is our basic oxygen-using hormone, so if you can have good thyroid function you are going to be producing enough CO2. And oestrogen in many ways, it actually blocks the secretion of thyroid hormone, but on cellular level, it changes the way oxygen is used, diverting it from making CO2 to consuming energy, shifting away from glucose metabolism which produces CO2, to fat metabolism which makes less CO2, and stimulating the uptake of water as a result of this shift in energy production. So oestrogen causes the breasts and the uterus and pituitary to swell up, by taking water into the cell, and the extra water stimulates cell division, so it causes the uterine growth and the breast growth and so on.

KG: So I take it from listening to you and from reading your work that you are not into anti-aging, even bio-identical anti-aging hormones via oestrogen.

RP: Definitely not because the older and more stressed a cell or tissue is, the more oestrogen it tends to produce. A young healthy person produces oestrogen primarily in the ovaries with some in the adrenal glands cortex. With stress, aging, falling thyroid function, the ability to synthesis progesterone – every cell in the body develops the ability to make oestrogen and loses the ability to excrete it into the bloodstream – so simply by becoming deficient in progesterone, your blood test won't show that you are deficient in oestrogen, because progesterone is needed to get the oestrogen from the cell into the bloodstream. But inside the cell is where oestrogen works, and so your fat cells, brain cells, skin, every tissue in the body has the capacity to make oestrogen when it is under stress. People with diabetes, their tissues all through the body are producing excess oestrogen.

KG: What do you think of the fat cell relationship to oestrogen?

RP: Yeah, that's the major bulk of it and some of that is actually getting into the bloodstream. But the breast tissue itself starts producing oestrogen even though it's thought of as the target of the oestrogen it becomes the source of oestrogen too and the uterus.

KG: I am going to ask you a really controversial question Dr Peat. How current would you say, what you just said is?

RP: Oh well, a man named P. K. C. Cary was one of the first ones to demonstrate clearly that fat after menopause especially, fat becomes a major source of oestrogen production, but since then 100s of people have demonstrated that with stress, diabetes and inflammation, the aromatase enzyme is increased and an Italian named Cutolo has been very good on the subject for the last 10 years.

KG: You know the anti-aging community, that is, the complementary supposed physicians, and the anti-aging community, the doctors that assert that they are the hormone doctors are giving women who have been through menopause bio-identical oestrogen called Biest in a cream form vaginally, progesterone in a cream form vaginally and testosterone in a cream form vaginally. What do you think about all that?

RP: The early studies of the vaginal oestrogen by itself, doctors were telling women that it's only local, it isn't going to increase your risk of breast cancer or lung cancer. But as soon as someone measured the blood after people were applying it to the vagina, they saw that it produced very immediate high levels all through the body because the membranes absorb it so easily. So local use is going to change the local tissues, but also increase the exposure of all of the cancer sensitive organs. It's been known since the 1940s, that all tissues will develop cancer or are at risk of cancer with continuous exposure to oestrogen. But if you interrupt it regularly with progesterone, and stop the oestrogen and have a good two weeks of progesterone exposure regularly, that tremendously reduces the carcinogenic effect of oestrogen.

KG: What do you say to people who say, "Look, we don't have any libido anymore, we've got to take something."

RP: Sometimes thyroid to lower the stress hormones including oestrogen. That very typically will normalize libido.

KG: So it is a whole system. If I am hearing you correctly, you can't really just deal with the hormones, the male and female hormones, you've got to include the thyroid? What else?

RP: Well, nutrition. If the liver isn't supplied with at least an adequate amount of protein and B vitamins, your oestrogen level will chronically stay elevated. If you don't eat enough fibre, your liver, even if it's supplied with good nutrition, it's detoxifying all the oestrogen that reaches it, if it's well nourished, and secreting some of it into the bile, some to go to the kidneys. But if you don't eat enough fibre or don't have a good active intestine, that oestrogen excreted into the intestine is reabsorbed. So just eating a carrot everyday, after just a few days it will normalize the hormones and a lot of people lowering the oestrogen, increasing progesterone and lowering the stress hormones, cortisol, for example.

KG: Let's talk about coffee. Let's get really controversial. Weren't you one of the first people in the US to tell people that coffee is good for you?

RP: Well, in the 1970s, a big monograph showing many of the biological effects, including the cancer protective effects of caffeine, and that was what really got me interested. They had been experimenting with tobacco smoke in the lab and showing that 96 to 100% of their mice developed cancers where the concentrated tobacco smoke was supplied. But they looked at their records for one week and saw that about 5 percent of their mice, that week, were developing cancer and they saw that

in the lab records someone had used this distillation apparatus for something involving caffeine, so their smoke had been contaminated with caffeine during that week and they repeated the experiment adding caffeine to a carcinogenic smoke and again it would only produce cancer in 5% rather than 95% of the animals.

KG: Wow!

RP: Then they tested it on all the classical carcinogenic compounds. Polycyclic aromatic compounds, radiation, ultraviolet and x-rays, viruses, every known cause of cancer was prevented by adding caffeine to the situation.

KG: Very interesting. You know there are some people, Dave Asprey from the Bulletproof Executives; he's popularized butter and coffee. What do you think of that?

RP: Each one is good, but I think cream is better in coffee.

KG: You mean tasting?

RP: Yeah, it tastes better.

KG: He's talking about not margarine but butter to get your saturated fats in and get the CLA in the brain first thing in the morning.

RP: Yeah, the butter just floats on the coffee and is sort of messy.

KG: Not when you mix it in a blender.

RP: You don't need to do that if you use good cream.

KG: I use both. Let's get to coconut oil. I was sitting at a Thai place about a year ago, this guy walks in and he sat down near me and I ordered a coconut, one of those pure coconuts, cause I just love coconuts and he says, "You Americans are crazy with the coconuts already and the coconut oil. What is it with you?" I said, "It's really good for you" and we started to talk but they laugh at us? But yet they live on coconuts and coconut oil. Talk to the public about coconut oil. I've done shows on it, but I like you share from your expertise about coconut oil.

RP: Again, in the 1970s, I was attracted to it by reading an article in which they had fed several groups I think it was 15 groups of rats on different diets - including either high fats, saturated fats, low saturated fat diet, a very high PUFAs diet, and a very low fat diet with only polyunsaturates, and so on - so that they had fifteen different compositions, very high fat, very low fat, pure saturated, pure unsaturated - and at the end of their life the leanest rats were the ones that ate the saturated coconut oil diet, regardless of whether it was high fat or low fat. And the fat animals were the ones that had the pure PUFAs. And again even a low fat diet if it were purely polyunsaturated, made them the fattest animals. So it wasn't the quantity, it was the

unsaturation. In the last several years, people have started talking about the saturation index, meaning the proportion of saturated fats to polyunsaturates in your tissues. And cancer patients are very low on the saturation index, so it's not only obesity producing, it's associated with high incident of cancers to have highly polyunsaturated diets.

KG: I have a question about thyroid and the kind of thyroid that you recommend people to take. I realize that you are not to prescribe anything on the show, but do you agree that people are still taking Armour thyroid or do you have a particular thyroid, that you think is more effective for what's going on today?

RP: The original Armour product was pretty stable for I think it was 90 years and they tested all of their batches on mice and would adjust the composition because it varied from animal-to-animal. And they would test it to make sure that it had exactly the same potency and when the finished product was tested and compared to others it was much more consistent than, for example, the synthetic synthyroid product which varied a lot from batch-to-batch. But Armour was an extremely well controlled product, but then Revlon bought it and the price went up from, when I was getting it as late as 1990, it was $8.00 for 1000 tablets and after Revlon bought it, the price doubled or tripled.

KG: They don't own Armour thyroid do they now?

RP: No, it went through 3 or 4 changes of ownership, each time with a price doubling, so from 8 tenths of cent per tablet it now is over 50 cents per tablet.

KG: Right, but that's a pharmaceutical industry phenomenon, right?

RP: Yeah. But at the same time they were changing the additives in it and there have been periods when the tablets wouldn't dissolve or they had a different behaviour or I stopped using it in the early 90's because some people found the pills they were going through undigested. So I started using synthetic products. Thyrolar, was the Armour company synthetic equivalent, since they tested every batch on mice, different synthetic compositions and got one that acted just like the original Armour product. So the sale of the company involved the sale of that product. For several years, I recommended that one, but then it became hard to get. Luckily, two or three other companies had copied their formula. Proloid had been a colloid purified from the gland, and they changed to Proloid S meaning synthetic, but the product is basically the similar composition in effect to Thyrolar. And a couple of other products: Cynoplus is one that I've used for a long time and it's very steady and reliable.

KG: Is that also a synthetic?

RP: Yeah.

KG: Some people listening say why Dr. Peat are you recommending a synthetic over something more bio-identical or bio…

RP: Well, the Armour Company invested a tremendous amount of work and research in their products. Smaller companies haven't had access to that research and when they changed their additives, for example, sometimes it changes the way their product works.

KG: I didn't know there were additives to thyroid.

RP: Most of the products have had some changes over the years. Armour used only sugar and magnesium stearate I think were the binders. They would adjust the amount of sugar slightly, according to the animals they used so that they always had the same functional potency. But now the companies don't have the resources to test every batch on animals and there just can't be the quality that Armour had achieved.

KG: What happened to Cytomel, remember Cytomel?

RP: In its foreign form it's called Cynomel, but it's made by the same recipe and so it has been very valuable and consistent.

KG: You know the whole testing of both the thyroid and the hormone matrix in men and women has really changed over the years. I remember that to test the thyroid they would take your blood, and some people now say to test the thyroid take your urine. They used to do that with male and female hormones, instead of the blood, they say that the active hormones are showing up more effectively in a 24-hour urine sample, do you agree with that?

RP: No. I think it's better business! The blood isn't such a great test for thyroid anyway, because if you have more oestrogen, more cortisol, more free fatty acids, different amounts of protein, a given amount of T3 or T4 in your blood, isn't going to have the same effect on the cells. And even the reverse T3 which goes up under stress, interferes with the action of T3 unless you have a computer program to understand the whole physiology, there's not much point in looking at the T3 and T4.

KG: You mean in the blood?

RP: Yeah.

KG: What about free T3 because the anti-ageing community says the real action and heart of the thyroid activity what's happening is in the free T3. Do you agree with that?

RP: Ask them what they mean by "free" exactly. The idea of a free hormone is very vague and contradictory. The way they measure it I think currently, they are still using a dialysis method that what passes through a dialysis membrane is called

“free”. But in the blood, hormones actually travel with proteins and fats, and in and on the blood cells, some people talk about it travelling on the red blood cells, but actually all of the hormones go in and out of the red blood cells, and so you have to break down the red blood cells really to know what’s actually in the blood and available to the cells. The thyroid hormones can bind to albumin; for example, albumin has free access in and out of cells, even into the nucleus, so anything bound to the albumin is going in and out of cells.

KG: So how do we test for thyroid? What’s the most effective way to test for the condition of our thyroid?

RP: Broda Barnes who was educated in the 1930s, who reflected a lot of the understanding that was based on the good research of the good Armour Co. He advocated temperature, morning temperature especially, as a very important indicator in the functioning of the thyroid. But other doctors in the 1930, used a combination of indicators for example, some people showed that there was a mirror image relationship between blood cholesterol and thyroid. When you remove someone’s thyroid gland, immediately the cholesterol increased in the blood stream as the oxygen consumption decreased. And if you then gave them a thyroid supplement, it was a mirror image again, the increasing thyroid and oxygen metabolism, caused the cholesterol level to come down to normal. I’ve seen people lower their cholesterol, they were in a hurry to pass an insurance health test, lower their cholesterol 2 to 300 points in a week by using hourly doses, not take a huge dose at once but just adjust and keep their thyroid where it should be. Carotene was another indicator; low thyroid people have high carotene. And carotene is antagonistic to the female hormones, in particular, but also it tends to block the thyroid. Reaction tests, the speed at which your muscles react and relax, corresponds to your thyroid function and oxidative metabolism. The achilles tendon reflex relaxation rate, is what was used in the 1930s, but a lot of doctors look at how far you jump when they hit a reflex trigger, but it’s the rate at which the muscle *relaxes* that corresponds to good thyroid function. And your brain undergoes those same reactions, so that on an electrical measurement of your brain waves or electrocardiograms, showing the speed and quality of the T wave, which is the relaxation rate waves, those all improve under the influence of thyroid. So any indicator of quick relaxation, quick energy restoration, normalizing of cholesterol, and various blood components, all of those help with the diagnosis.

KG: How many tablespoons of coconut oil a day do you have?

RP: Oh, I haven’t eaten it regularly for a long time. Incidentally, I’ve always used the cheap refined stuff, now I use it just for occasionally frying things. When I had a tablespoon or two everyday over a period of I guess it was 6 or 8 weeks, I lost weight that I had for about 20 years and went back to my 1970s body weight.

KG: And you think it was just from that alone? You don’t think it was from pregnenolone?

RP: No. I had used pregnenolone before without any change and when I experimented in around 1980 with DHEA, I noticed that I was looking slimmer, had a smaller waist, but when I weighed myself I weighed exactly the same. It turned out I had grown a little at the age of something like 44 and built more muscles so that even though I looked slimmer, I was actually the same weight, but then about 12 years after that is when I started using a little coconut oil and went down about 14 pounds.

KG: You made a point of saying that you used the refined coconut oil and not the unrefined, which everybody recommends the unrefined, you made a point of saying that, why?

RP: Because a lot of people are allergic to the extraneous material other than the fat in the oil.

KG: So you used the refined?

RP: Yeah, the deodorized kind, basically the tasteless kind. And if you are not allergic to it, the very aromatic unrefined kind is nice for making ice cream, for example, coconut flavoured but for frying eggs it smells terrible?

KG: Smells terrible, it tastes terrible. Some people love it, but I don't know how they love it, they must do something with it. I want to ask you a little bit about serotonin. So many people as they get older, start to lose their serotonin production or it goes down. Do you agree?

RP: No. The way it's measured I think the only simple way to measure it, is by the break down product called 5-hydroxyindoleacetic acid (5-HIAA), that indicates how much your destroying or excreting. To do a blood test you want to see how much is in the platelets and how much is in the free liquid of the plasma. Because the total amount in the platelets as long as it's inside the cell, it isn't hurting you. But if it's free in the liquids of your body and is deficient in the platelets that means something is causing it to be not retained properly as if they are excited. The normal function of the platelets is 95% of your body's serotonin, and is made in the intestines, anything that inflames your intestines even the chemical irritations, stretching it with a gas blow-up, or irritating allergenic foods, all of these increase the intestines production of serotonin. And the serotonin moving from the intestine into the blood, is picked up by the platelets, and if they bind it firmly, they carry it to the lungs where the situation of the CO2/oxygen exchange, causes them to release it where enzymes in the lungs destroy the serotonin. Negative ions in the air seem to help the lungs to destroy the serotonin in an oxidative process. If your lungs and platelets aren't getting rid of the excess serotonin made in an irritated intestine, then it gets to the brain and can cause things such as anxiety, aggression and even depression, turning on the inflammatory system. Serotonin is a major stimulant of the corticotrophic release hormone, which activates your pituitary, to turn on your adrenals stress reactions, so serotonin reaching the brain is a powerful stressor.

KG: If people have a hard time relaxing, they have a hard time sleeping at night.

RP: Most often it's either poor nutrition or hypothyroidism. Some of the old people I mentioned who solved their problems by adding salt to their foods, noticed that when they followed the doctors orders to not eat so much salt, they developed insomnia. In the study where they were told it was OK to add salt, their insomnia was cured. And that led me to realize that salt is a major factor in lowering the stress hormones especially adrenalin, one of its functions is to counteract the effect of too much serotonin.

KG: How is it that, it is said, and this is a popular myth then, that serotonin and people over 50 is dropping and that's why they should take tryptophan at night because tryptophan produces more melatonin but doesn't it also produce serotonin?

RP: Experiments show that especially the hydroxytryptophan, very directly corresponds to increased serotonin.

KG: And isn't serotonin the "happy hormone"?

RP: No. The name means the pressure increases or the serum toner. It was identified in the 1950s, as the cause of emotional disturbances, blood pressure disturbances and many circulatory problems. In the 70s, this myth about it being a "happy hormone", on my website, I explain some of the circumstances accounting for that very odd myth.

KG: Is that in the article 'Serotonin, Depression and Aggression, The Problem With Brain Energy'?

RP: Yeah, that's one of them but there are several of them.

KG: You have so many. It's hard to keep track of you.
Lets talk a little about radiation, were covering a lot of subjects, I know we are going quickly on these but there's a lot to say on this on this for women over a certain age. We're all told that we need to have an annual mammary breast exam but we need to have a mammogram, which I refuse to do. I do a thermogram. We're told that we need to have annual x-rays at our dentist. I know people who have had MRI after MRI after MRI and they're are being radiated, let's talk about it. What's your take on the whole thing?

RP: In the 1950s, I got interested in the issue and I've been following it ever since. In the 1950s, the government would basically destroy the career and reputation of anyone who said radiation was harmful. They were in the business of selling their atomic bombs and atmospheric testing, so they had to say it wasn't killing Americans to drop radioactive fallout on them. But later, calculations showed that in fact, at a minimum it killed 15,000 Americans not to mention the rest of the world. That was a minimal calculation. But in the 1950s, one of their big mouthpieces was John

Gofman, who happened to also be a promoter of the cholesterol theory of heart disease. I considered him sort of a demon, because every time someone would point out the dangers of fallout, he was there to say it hasn't been proven that it causes cancer, or sterility or mutated children or mutated great-grand children and so on. Always "Don't worry, it's probably harmless". But in the 1960s, he later reported that he came to consciousness in the middle of one of those lectures and realized that he was saying insane things. But he had been a very influential government spokesmen ever since the late 40s, through the 60s, and his whole life after that was trying to bring some sanity back to the radiation business. One of his last works, it might have been his last major book, was on the radiation influence on health. Medical radiation, he showed was currently the biggest cause of breast cancer and heart disease, because of flowing radiation through the chest of millions of people at frequent intervals the heart and the breast were getting exposed by chest x-rays and mammograms. He showed, for example, that the incidence of these diseases corresponds to the availability and use of medical services. So that the rich areas around San Francisco, for example, had the countries highest rate of breast cancer and very high heart disease. West Virginia, with the lowest access to medical care on average, had the country's lowest incidence of breast cancer and lowest mortality. That corresponds with all of the honest animal research. It overlaps very interestingly with oestrogen cancer research. People who did studies including both radiation and oestrogen exposure showed that they synergized. You get a certain amount out of cancerization from either radiation or oestrogen, but when you have both of them it's even more than additive.

KG: It's compounding. What do you think about Homeland Security doing low-level ionizing radiation equipment on people that are trying to travel?

RP: I don't know the current motivation. But one of their apparatus's that was irradiating people for a time, the business was owned by the head of the agency, Michael Chertoff. I think it's primarily money making business as well as keeping the population fearful?

KG: Having to do with health - what do you think of people going through those machines?

RP: Well, all of those types of radiation are known to be harmful.

KG: You know what they told me at the airport last year? Somebody said when I refused to go through the machine I said, "it's OK. You can do a pat down". Then I won't even tell you what happened on that. The woman said to me, "When you fly in the air, you're getting just as much radiation".

RP: Yeah, that's a story that was invented by both the people doing the atmospheric bomb testing and by the nuclear power industry, which was closely involved with the bomb industry. The whole thing was a single culture, people going in and out of military bomb manufacture and private electrical power generation.

Their story was that these ions, the radioactive isotopes, of various metals and other compounds that are released from bombs and from the nuclear reactors, including Chernobyl, Fukushima and any operating reactor, for example, the area around the Rancho Seco Reactor in California, the water supply contains isotopes from that reactor that are probably still causing cancer many years later. These deadly particles that release radiation in your body after they have been ingested or breathed in, have almost an absolute carcinogenic effect. Each one destroys a series of cells, mutates them, and the radiation from an x-ray, which is powerfully carcinogenic, is many times less carcinogenic than breathing in these particles. But the low voltage x-ray that produces the best image of a breast, for example, low voltage sharp imaging mammogram devices, these are still being promoted, even though it's known that low voltage, low energy x-rays are much more carcinogenic than high voltage. The principle is that low energy radiation is more easily absorbed by tissue, gamma rays will penetrate through a meter or more of concrete, which means their passing through your body relatively little of their energy is absorbed by the tissues. So the extremely low energy of ultraviolet, for example, 100% of it stops in the first few millimetres of your skin so you get a very intense sunburn. The higher the energy is, the less tissue damage there is, for the given the amount of radiation, because it passes through without doing anything. The radiation you get in an aeroplane, it's similar to living at a higher altitude; this is high-energy cosmic radiation primarily.

KG: Isn't that a gamma ray?

RP: It releases gamma rays which are much less harmful than low energy x-rays, much less of it is absorbed. With cosmic rays, it almost all passes through your body harmlessly, it's going at such a high velocity that it leaves a stream of minor ionization but it seldom produces carcinogenesis. And studies looking at the cancer incidences in the United States or even within a state like Texas where there's is a variation of stable population at different altitudes, they see that there's a negative correlation between cancer and altitude that corresponds to the fact that at high altitude you get a lot of cosmic rays, but they are high-energy and pass through you. At low altitude, those same rays have passed through a thicker layer of atmosphere running into more oxygen and nitrogen atoms causing collisions that release radioactive particles. So you're actually getting more radiation from cosmic rays at sea level than at high altitude. But the industry which has known that and that the actual incidence of cancer increases at a lower altitude, the industry has been lying about that for 50 years.

KG: You know I've just found out that I am taking this trip to Spain, this May and I found out that Spain is the second highest country elevation in Europe, first is Switzerland, and the second is Spain. Have you ever been?

RP: No, I never went to Spain.

KG: So I will be at a very high altitude and having a good laugh.
Do you live in the mountains?

RP: Ah no.

KG: You live at low altitude? I'm surprised.

RP: I have a house in Mexico, that I hope to get to soon at 66 hundred feet, but it's close to the volcanoes where you can get up to 17,000.

KG: Wow

RP: The only times I've been up that high, the higher I went, the better I felt. It is something you can feel immediately as a lack of stress.

KG Lets go back to how we get more protective CO2. Cause I don't think we've finished that, do you?

RP: No, in an acute situation, you can apply it to a high blood pressure example, or anxiety or other acute symptoms. You can breathe into a paper bag for a minute or two at a time, until you've got the feeling that your suffocating, and then breathe some fresh air and doing that two or three times a day is usually enough to over a period of a few days is enough to lower your blood pressure, and it will stop the anxiety quickly. But for something like arthritic knee or broken bone or a sprain ankle and such - that you can put in a plastic bag filled with CO2 - this has been done mostly in Europe; it's the only place in hospitals, I know that have done it, but I've seen people do it and radically increase the healing of injured tissue. Once I was coming home with a huge tank, (must have been a 35 pound tank or so) holding it with the valve at the top, and I stumbled on the steps to a brick walk and I didn't want to drop the tank and risk breaking the valve off which would create a rocket effect so I hugged the tank to my body, and went down, fell on my wrist against the bricks with my body and the tank on top of it.

KG: I think I am going to faint, just with the imagery of this, but go ahead.

RP: I thought maybe it would start to turn blue and I rushed in the house and got a plastic bag and filled it with CO2 and held my hand in it for an hour and brought my hand out there was no injury.

KG: How did you get the CO2?

RP: I had the tank right there in my hand.

KG: OK, it was the tank. How did you get the CO2 in the tank?

RP: I bought it from a welding shop.

KG: Very cool. You are very creative, are you still doing your Art?

RP: Oh yeah,

KG: You still painting?

RP: Yeah. I think of myself primarily as a painter who doesn't have any customer's. (laughs)

KG: laughs…. Do you want customers?

RP: I tried to be a portrait painter for a while, but I decided that I didn't want to paint the way they wanted [me to paint]. For example, they would have fairly silly-looking kids that wanted to look like classical story book illustrations or something. But I like doing realistic things that actually show the personality but my customers didn't like that.

KG: [Laughs]…That would be scary if that happened with this Rainmaking Time. Sometimes the customers may not like what we talk about but we got to talk about it.

KG: Want to talk to you about modern lighting for a moment. Are you aware that the modern lighting of society, that these tablets and the cell phones and the computers are all interfering with our melatonin, day and night cycles and the pineal gland functioning?

RP: Yeah.

KG: That's another reason why some people can't sleep at night even if they are not going through menopause and they're not in any major hormonal change.

RP: Yeah, if you get your hormones and CO2 up where they should be you are pretty resistant to those minor field disturbances but they are constant drain on our systems. So one of the reasons I pick out the town in Mexico, for my house was that it was known as a radiation quiet zone. The National University built a radio telescope just outside of town because it was so free of telephone pollution and such, you couldn't get radio or telephone or television signals there.

KG: You know we have so much Wi-Fi and cell tower infiltration of society. I am not sure we are going to be able to understand why people are so sick in so many different areas exactly; it's not even on the radar (no pun intended) of the health fields?

RP: If you work with an electrical machine, for example, you are constantly 8 hours a day exposed to fields that probably are not as intense as some people get when they live near a phone tower, but those electrical machine operators are known to have had a very high rate of Alzheimer's disease and other degenerative diseases. So I think the zones around high electromagnetic emissions are going to turn out very sick.

KG: Oh for sure, we've done a lot of shows on this. Is there a test to measure the CO2 in your body so you can see if you're improving your CO2 levels?

RP: Yeah, I don't know how expensive the gadgets are but I got one, I guess 15 years ago that cost $1300 that you blow into it at the end of your exhalation and can see how much CO2 you're producing.

KG: You know the name of the machine?

RP: Oh it's a capnometer or capnograph you can find them on the internet, they should be available for about $35 but I don't know whether anything is commercially available right now.

KG: Well we are in the age of miniaturization, right. Things are getting smaller and smaller and being produced faster and faster and cheaper and cheaper, so maybe it's at a level of affordability for most people who might be interested.

RP: Yeah, when I first wanted to measure carbon monoxide in the breath, the cheapest I could find was $10,000, but now they're $30.

KG: Do you mean monoxide (CO) or CO2?

RP: That was CO. And if they can do it with CO they should be able to do it with CO2.

KG: Most certainly, most certainly. Lets hit the big one and talk about pregnenolone. You're a big pregnenolone advocate; tell us what it is, and why you suggest we use it?

RP: When we metabolize cholesterol what happens is under the influence of thyroid hormone, which stimulates oxidation and vitamin A, which activates the enzymes to clip a chain off cholesterol. Thyroid and Vitamin A are the factors we need mostly, for producing pregnenolone from cholesterol. So if you're low in cholesterol or thyroid or vitamin A, you're necessarily going to be deficient in pregnenolone. And pregnenolone is the immediate precursor to progesterone and DHEA. Progesterone is the precursor to cortisol; DHEA is the precursor to testosterone, and other androgens and oestrogen. If you are deficient in the precursors, the body will still have the ability to make a normal or even increased amount of the end hormone, which in the extreme situation tend to be cortisol and oestrogen. The deficiencies of thyroid and/or Vitamin A and/or cholesterol, will because not making enough pre-cursor, will tend to expose your body chronically to high oestrogen and high cortisol. And when you get the precursors, it happens that pregnenolone inhibits the stress process, and turns down your ACTH and adrenal hormone activity. So that in itself it blocks the effects of those hormones but at the same time it's blocking the production of those hormones. And so it is doing many things, protecting against the harmful stress mediators and in itself it works somewhat like CO2 that stabilizing cells so I've seen people, for example, with emphysema who were purple because

they couldn’t get enough oxygen. In just a few days they were back to normal colour, breathing, walking upstairs and no problem and so on.

Progesterone has that same effect on the lungs - getting rid of excess water so that oxygen can get through the bloodstream, and in inflamed joints it has the same effect releasing water that shouldn’t be there. For example, bulgy eyes in so-called Graves’s disease where the eyes are protruding, I’ve seen peoples eyes recede back into a more normal position where they could close their eyelids in just an hour or so. It has its intrinsic protective effects as well as its indirect effects of blocking and reducing the production of stress hormones and then it also is a precursor for the other protective steroids DHEA and progesterone. At around 1990, the whole idea that instead of being all produced in the gonads and the adrenals, it was realized that steroids are being produced in many tissues. And the brain and skin are major steroid producing factories, and the major brain steroids happen to be pregnenolone, progesterone and some DHEA - and the minor products from those – but the basic protective steroids in the brain especially but through out the body are these three.

KG: Do you take DHEA?

RP: Yeah, I am currently taking a couple of milligrams per day.

KG: You notice a difference?

RP: Yeah, it gives me nicer dreams

KG: Nicer dreams? Laughs

RP: Yeah. A general feeling of euphoria.

KG: Now how much pregnenolone do you take -100mg? What are you taking?

RP: Oh, I stopped taking that about 10 years ago when I couldn’t get a reliable source so I found out that by adjusting other things thyroid and diet. I am apparently making enough that I don't feel an effect when I take some.

KG: So you’re taking thyroid and your taking very little if any, coconut oil, right?

RP: Yeah, very little just for frying things occasionally. I count on foods for my nutrients and keeping the hormones in balance mainly by adjusting my thyroid.

KG: So, you are not taking pregnenolone?

RP: No. I haven’t for quite a while.

KG: And you wouldn't recommend it to anybody?

RP: Oh, sure, I recommend it freely if you are not allergic to it. Most of the products now contain strange binders; everyone seems to think it's necessary to put [in] silicon dioxide.

KG: Even some of the companies that are supposedly have all these great products they are putting all kind of weird binders, you're right.

RP: I think they're just convinced by the sales people whatever the chemical companies have to sell, they convince the supplement manufacturers that they need it to make their pills prettier.

KG: So, how do you get enough pregnenolone in your system?

RP: Eating foods that keep my cholesterol production high. Orange juice is my main one. I've seen people go from about 130 cholesterol to 160 or 170 in just a couple of weeks just by drinking an extra or maybe a quart a day of orange juice.

KG: Are you talking about juiced - orange juice - or are you talking about a concentrate?

RP: Well, I always recommended the frozen concentrate until several years ago, a lot of people started having bad reactions to it and I got asthma from most of the types and so I started using only sweet freshly squeezed oranges.

KG: And why do some people would say "Oh my god high that's high in sugar, why wouldn't that cause a problem with your glucose metabolism?"

RP: No, you need sugar to make thyroid hormone and to make the various things related to cholesterol.

KG: Is that really true?

RP: Yeah sugar is the main pre-cursor and regulator for both thyroid and cholesterol.

KG: Wow this is news to me it's news.

RP: I wrote a couple of articles on diabetes that talk about the effects of sugar in general and its ramifications and especially when it comes in the form of fruit, like orange juice, the minerals potassium for example, takes on the function of insulin, and so your body doesn't bother producing insulin. Because the orange juice is so easily metabolised without insulin, so it is not fattening the way if you get the same amount of sugar from starch. The starch is a powerful insulin stimulant and insulin tends to turn carbohydrates to fat.

KG: Do you think that it's possible for people with diabetes to get off of insulin shots?

RP: I've known a couple of people who did it in a week by radically changing their diet but I think it's good to measure things carefully and figure on doing it over a period of a few months. My father had a diagnosis of diabetes when he was about 30 and had wasted away to well under 100 pounds, when he found an old naturopathic book that by treating it with brewer's yeast. And when he started eating nothing but brewer's yeast for a few weeks, he stopped producing glucose in his urine and started gaining weight, he gradually added other foods but for a few weeks he ate cups full of brewers yeast as his only food, after he got his weight back up, he lived 48 years after that with no sign of diabetes.

KG: How extraordinary. Now that was with your help?

RP: No. He and my mother found that themselves.

KG: Are your parents still alive?

RP: No, they died 40 years ago.

KG: You miss them.

RP: Oh sure.

KG: Did they understand you and your work?

RP: Oh yeah, they were collaborators.

KG: Really?

RP: Yeah.

KG: Were they scientists or doctors?

RP: No. Just co-conspirators in finding things out.

KG: A lot of people dream of having parents like that.

RP: Yeah.

KG: That's extraordinary.

RP: Yeah, they help me start the Blake College in Mexico in the 60s.

KG: That's great. And last subject and we'll still never we'll scratch the surface with you is osteoporosis. There are so many opinions about how to prevent osteoporosis. Some people say take vitamin D3 in high quantities, some people say lift weight - do weight bearing exercises, but everybody wants to go in and get one of those bone scans.

RP: Yeah, x-rays happen to poison bone metabolism, so the more bone scans you have, the more osteoporosis you are going to get. And the doctors have known for at least 15 years that looking at the bone with ultrasound is many times more valid than the x-ray scans. And ultrasound stimulates bone strengthening, so it is totally crazy not to use ultrasound to test your bones.

KG: Do you think it is possible to order a test to have your bone density checked by ultrasound today?

RP: Yeah, there are good machines and minimal machines. The good ones can tell you how strong the bones is, the minimal ones will just tell you where it rates on the scale of density, but it's sort of hard to find them because the x-ray people discourage competition.

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KG: For sure. You don't know of a single place in America that one could get their bone density tested via ultrasound?

RP: I think someone found one in NYC but they are very hard to find around the country. I know the machines exist but they are probably mainly for research purposes.

KG: I see.

RP: And lots of doctors are steering women away from using thyroid. An article in JAMA around 1985, reported that women who took thyroid had more osteoporotic bones, but they were taking thyroid according to what was current prescribing practices at that time. So when they had someone with serious thyroid deficiency, they were typically giving them only half as much as they needed and so what they were seeing was hypothyroid women who were under-prescribed had more osteoporosis than healthy women. But the animal studies show the actual picture in which, for example, around 1940 rabbit studies showed that giving a toxic amount of Armour thyroid in the diet, rabbits normally don't have very vigorous thyroid activity, but they gave them I think, one percent of the mass of their food was armour thyroid powder, it would be like us eating tablespoons of thyroid pills.

KG: Oh my God.

RP: And it stimulated their metabolic rate so much that they couldn't eat enough food to maintain their body weight.

KG: So they waste away?

RP: They wasted away and died of skinniness but when they looked at their bones they had abnormally dense strong bones so the bones were the most protected tissue in the case of thyroid excess poisoning.

KG: You know it is very interesting because you can change something at a molecular level, and you've changed the whole thing, and very little do I hear of doctors or researchers talking about the alteration of the molecular level of food, water and everything.

RP: Studies on the scull bones of young mice are very thin bone structured, that's easy to study in a dish because it can absorb its nutrients directly from the culture dish. They found that T3, the active thyroid hormone, stimulates the metabolism of the bone cells causing the production of CO2, which combines and crystalizes with calcium from the solution, forming new bone directly in vitro can be demonstrated under with the influence of active thyroid.

KG: Interesting. We really have to explore the details of things, I like that you get into so much detail, it's very important, very, very important. And I remember 4 and half years ago, when I was doing an examination of what's happening with climate, and it wasn't until I was deeper into the investigation, that I found out that the climate assertions and declarations have all been done by computer simulations, and not by real data. But I just want to tell you this is an example, so when we talk about health and wellness, I like that you go into so much detail, because it is in the details obviously and the synergy that is in the whole system, and it's in the whole organism. I like that you take this approach to looking at things and you look at evidence and details but even in the anti-aging fields I've notice, that I myself, have been imbued with inaccurate information.

RP: It's a constant process of trying to enlarge your context and field of reference because within one context the medical school professor can sound very convincing. But when you look at a broader context and see what experiments people were doing 50 or 100 years ago or 150 years ago, things looked very different. That whole context dropped out and they re-constructed the kind of context that fits basically what they want to sell.

KG: What do you think of this Affordable Care Act? Do I dare ask?

RP: I think I would rather pay the fine than be forced to buy insurance. First of all, I haven't been to a doctor since I was 10 years old I think, except to have obligatory examinations like to get my drivers license in Mexico - I have to have an exam every 6 years - but otherwise I avoid doctors. And I would avoid insurance except that the state requires car insurance and now they're requiring health insurance but as far as possible I would rather pay the fine.

KG: Is there anything else you would like to say to the audience today?

RP: Looking at the big context is the important thing; you're constantly being subjected to misinformation and it's necessary to look at concrete experiments and then see whether someone has done counter-experiments that would invalidate those.

KG: Don't you find that a lot of the testing that is done connected to the pharmaceutical industry is not real testing, in other words, they use the population as their test rats a lot of times?

RP: Yeah. The figures of the labs for the normal range, first of all they are done on medical populations. No one sets aside a population that they define as healthy and finds out what the real numbers should be. One study looking at the TSH range, they sorted them out, people who had been tested at one time and looked at the ones who later over the next 10 or 20 years developed thyroid cancer or other cancers. They found that the ones who TSH was below 0.4 on the scale, it usually has that as considered too low, they were the ones who were freest of cancer. If you consider that the numbers, represent a sick population, who wants to be standardized to a sick population?

KG: You know some people would say well you know, "We can't test this stuff on healthy people, it's not ethical." What do you say to that?

RP: It's even worse to test it on sick people.

KG: (Laughs). At least healthy people are better apt to make a decision whether to be tested or not.

RP: Yeah.

KG: Yeah. OMG! Ladies and Gentlemen we have been talking with and learning from and listening to Dr Ray Peat, you find can find out more about him and his 100s and 100s of articles and experience and expertise by going to www.raypeat.com
Dr. Peat, I hope you will come on again. I'm going to have a panel come on and love to hear you share with the other panelists your expertise as we talk about other subjects to come. Thank you so much for being with us.

RP: OK. Thank you.

KG: Thanks for all your work in the world, bye bye.