Bone

a lot more than just a skeleton

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Radiation

Taken from A. Krichkov and O. Shnaybel
"Philosophy and Science Multiplied by the Squared Velocity of Light "
and
TATIANA CHERNYSHEVA, M.D., PH.D.,
Talk give to ICAK 50th Annual Meeting, Washington USA June 2014

Between 2005 and 2011 American and Russian nuclear scientists measured an annual cycle of maximum radioactivity count rate in January and February with minimum count rate in July and August for 7 years in a row. This experiment has only been performed 3 times from the moment of the discovery of radiation in 1896.

A conclusion was made based on the statistics that changing of the radioactivity was related not just to the earth's rotation round its own axis, but to changing the orientations of our objects in relation to the sun and immovable stars.

The Earth moves around the Sun on an elliptic orbit at an average distance of 150 million Km with the average speed of 29,765 Km/sec. The speed is not constant, in July when passing the aphelion point it is minimum whereas in January when passing the perihelion point it is maximum.

Radioactivity appears to depend on the Earth movement speed. In July radioactive component is less active, the speed of Earth movement on the orbit reduces concurrently. Then in January, when the speed of movement of the orbit increases, an increment of radioactivity component is observed.

Late 1990's investigations commenced in Russia regarding low energy nuclear reactions which occur in a human body and the influence of these reactions on human physiology.
All the investigations were performed by nuclear spectrometry and radiometric survey methods.

Investigation using a product known as "Star Dust" (SSH&H) and its effect on gamma radiation indicated counteracting carcinogenic factors, slowing down malignant neoplasms, expressed gero-protective effects, reduction of average body temperature, levelling of hormone blood profiles -

average and maximum life expectancy increase in humans and animals.
Investigations did not reveal any active components in the preparation itself (a medicinal preparation must contain an active component). There was no explanation of the mechanism of influence on body physiology.

With the first measurements where radioactivity indicators were used, it was noticed that when the preparation was administered, the indicators located 5-10cm from the human body recorded increased gamma radiation. The energy emission was of extremely low power. The Star Dust contained no radioactive elements.

The preparation had no chemical elements or radionuclides that could influence energy changes in a human in the gamma quantum spectrum.
The preparation demonstrated its activity only upon interaction with the internal medium of a human body.

Researchers faced issues as to whether human radioactivity is an incidental phenomenon in a human life or not and whether a person interacts with his surrounding world by means of his own radioactivity or not. It is known that a human cannot influence radioactivity and radioactive disintegration in natural conditions.

The increase in human radioactivity was extremely low, within the range of natural radiation background readings of 0.09 µSv/h – 0.24 µSv/h. The observation showed that the short term increase in human radioactivity is safe for his health and life.

When a human becomes a source of radiation (electromagnetic wave emission) the assumption was that a fetus becomes a source of electromagnetic radiation in a certain period of its existence. Observations were made was between 12-39 weeks.

A pregnant woman even at a late gestational stage was found to have no difference from a non-pregnant woman of the same age and weight in a control group.

Further in a delivery room taking 5 spectrogram readings –

1. **Mother before delivery**
2. **Mother after delivery**
3. **Child at the first breath**
4. **Child at early postnatal supervision**
5. **Child at later postnatal supervision**

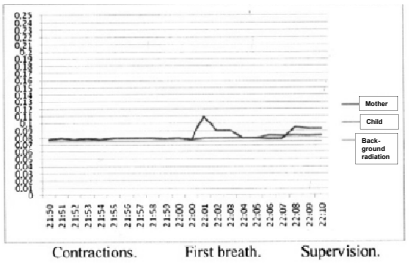


Figure No. 2. Diagram of events at count rate in gamma pulses per second (count rate 500 pulse/sec).
The vertical axis shows the gamma pulse per second count rate.
The horizontal axis shows the events.

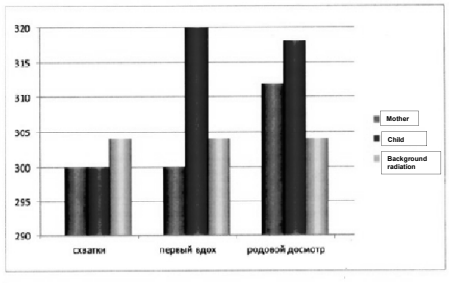
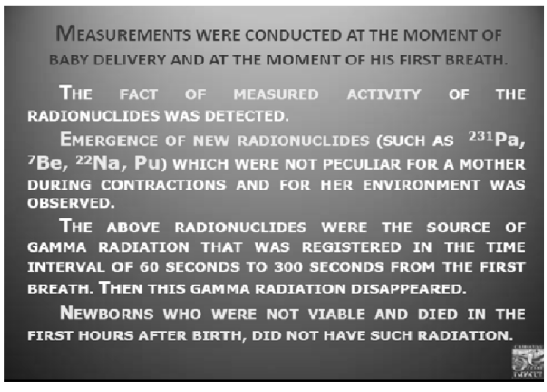


Table No. 1. Average activity of radionuclides by gamma radiation, as of the moment of delivery, the first breath and postnatal supervision.

The assumption that energy redistribution occurs at the moment of delivery was not proved. Analysis of the spectrograms per a delivery allowed for a conclusion that there is no energy redistribution or energy transfer from mother to child.

As of the moment of the first breath of the child, recorded and measured activity of radionuclides is observed which do not show during the mother's contractions. Analysis concludes that energy is transferred to the child with the help of a nuclear reaction. This is a single and simultaneous exposure throughout the energy spectrum.



The spectrogram of a child at the first breath differs from the mother's spectrogram with a lesser number of events at the later postnatal supervision only. An hour later a child's spectrogram is similar to a spectrogram of an adult. This up to now has been an unexplained phenomenon.

Failure to measure this radionuclide activity in a newly born child indicates a poor prognosis. In the period of silence after the birth of 20-120 seconds, a spectrometer registers and measures radionuclide activity. Failure to register activity in the actinoid family leads to deteriorating health.

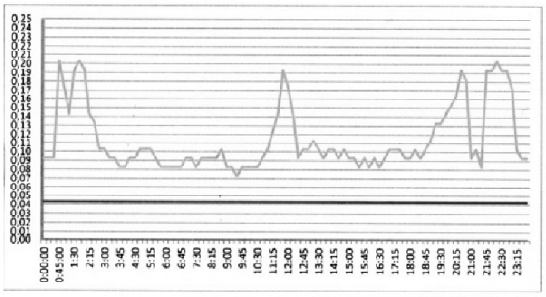
If trans-uranium nucleotides are not registered there develops a respiratory standstill after the first breath and intensive care is required.
If the registration is positive, the child cries and breaths.

An unknown energy source transfers energy to a new born human with the help of a Highly Organised Energy Medium. The same phenomenon occurs with all animals life. It is thus friendly to all life as it has given away part of its energy which accompanies the person throughout his life.

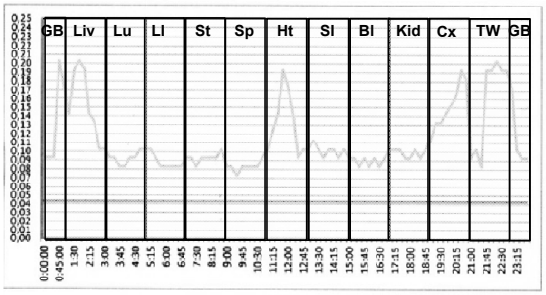
If we consider that every living human has a part of energy given away by the uninvestigated phenomenon, the power of such a phenomenon is enormous and may rest outside the boundaries of the laws known to humankind.

A body that emits light or heat loses energy, this energy is not manifested as energy of any other body until radiation reaches such a body. Therefore if the total sum of all energies in a system must stay constant, then emitted energy must exist as radiation energy in the ineterin period of time.

After a human enters life, energy emission and redistribution occurs in his body every day. As recorded by nuclear spectrometry and radiometry methods. Energy emission occurs 5 times a day.



The red color means the calibrated background of the room.
The green color shows values of human radiation monitoring.



The red color means the calibrated background of the room.
The green color shows values of human radiation monitoring.

HUMAN OWN RADIOACTIVITY IS CYCLIC BY NATURE. GAMMA RADIATION PEAKS WERE REGISTERED FIVE TIMES A DAY.

WITHIN A DAY ENERGY IS REDISTRIBUTED IN A HUMAN AND RELEASED BY HIM IN CERTAIN PERIODS. THE NATURAL RADIONUCLIDES SUCH AS RADIUM AND ITS DAUGHTER PRODUCTS, ^{40}K, ^{235}U, ^{214}Bi, ^{232}Th – WHICH ARE DISTRIBUTED IN THE HUMAN BODY – TAKE AN ACTIVE PART IN THE PROCESS.

PERIODICITY OF HUMAN GAMMA RADIATION IS REGULATED BY THE HUMAN'S UPPER RESPIRATORY TRACTS AND HIS EYES THROUGH THE SYNTHESIS OF THE PHOTOPIGMENT MELANOPSIN IN THE RETINA.

ACTIVE PERIODS OF HUMAN GAMMA RADIATION IN A DAILY CYCLE

DAY:

$11^{15} – 11^{30}$ – THERE IS AN INCREASE IN THE ACTIVITY OF RADIONUCLIDES ^{40}K, ^{235}U, Ra + dau, ^{238}U, AS COMPARED TO THE PASSIVE PERIOD OF THE DAY.

NIGHT:

$00^{30} – 00^{50}$ – INCREASE IN THE ACTIVITY OF RADIONUCLIDE ^{232}Th.

$00^{55} – 01^{15}$ – INCREASE IN THE ACTIVITY OF RADIONUCLIDES ^{235}U, Ra + dau.

$01^{30} – 01^{59}$ – INCREASE IN THE ACTIVITY OF RADIONUCLIDES Ra + dau, ^{40}K.

EVENING:

$19^{40} – 20^{00}$ - INCREASE IN THE ACTIVITY OF RADIONUCLIDES Ra + dau, ^{235}U, Th + dau.

$20^{30} – 20^{50}$ INCREASE IN THE ACTIVITY OF RADIONUCLIDE Th + dau.

$21^{15} – 21^{35}$ - INCREASE IN THE ACTIVITY OF RADIONUCLIDE ^{235}U.

$22^{00} – 22^{30}$ - INCREASE IN THE ACTIVITY OF RADIONUCLIDE ^{232}Th.

$22^{50} – 23^{00}$ - INCREASE IN THE ACTIVITY OF RADIONUCLIDE Th + dau.

During preclinical observations over average temperature of human body the following result was obtained upon administration of Star Dust average body rectal temperature range of human and animals reduced by 0.1 – 0.2ºC.

The only way to reduce body temperature range without damage to physiology is using own electromagnetic radiation. Star Dust demonstrated the ability to maintain his ability to be a source of electromagnetic wave, which is in turn the reason for temperature reduction.

In ordinary life a human switches on his own cooling system, in the form of his own electromagnetic radiation five times a day. The mass of particles is 3.25 times less than the mass of an electron.

The fact of human radiation by energy ^{40}K is of great interest. This is a powerful energy related to human cardiac muscle but not for cooling purposes.

A heart, even segregated from a body, continues generating electrical pulses, as a result of which the heart spontaneously contracts, providing that it is supplied with sufficient quantities of potassium and oxygen. The myocardium of an adult consumes 70% of the total potassium contained in the organism.

Radiation by ^{40}K was absent both in the pregnant women in their late gestational age and at the moment of delivery, increase in ^{40}K activity was measured only in the beginning of early postnatal supervision, 2-10 minutes after the delivery.

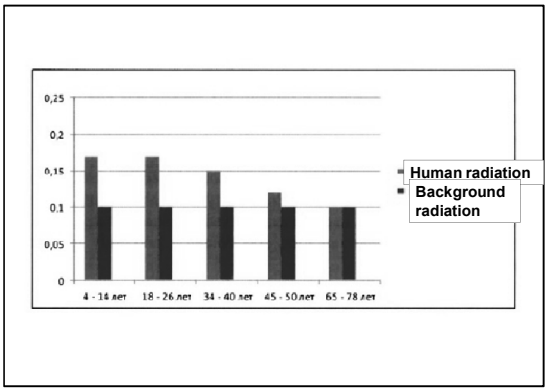
The heart of a fetus has an inter-atrial foramen in the inter-atrial septum between the right and left atriums and blood can flow unrestricted. After a child takes his first breath the following happens – the inter-atrial foramen stops functioning and overgrows. Normal foramen size is 4.5-19mm.

Should the umbilical cord not be cut immediately upon delivery, in 5-10 minutes the glossing, pulsing stops pulsing, which certifies that the interatrial foramen has overgrown and the heart has turned into a pump system from the communicating vessel system. This is an unexplainable phenomenon of the heart.

A hole made by a needle 1mm in diameter, is painful and need s some time to overgrow. While in the process of delivery we deal with the fact of the overgrowing of a large hole in a heart in a short period of time. After his first breath a child enters life.

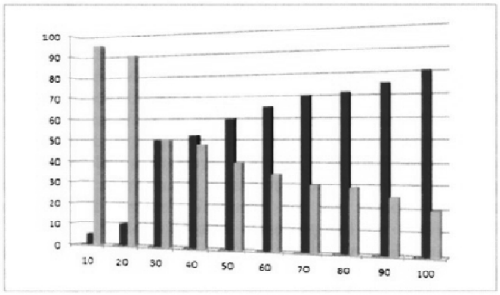
The heart is a powerful 4 chamber pump, needs potassium and exactly 2-10minutes after delivery, when the heart has been formed, activity by potassium is recorded.

Having considered, from the point of view of nuclear interactions and transformations such stages of fetal formation, delivery, first breath, post natal supervision and daily cycles we can next examine other stages in human life as age qualification in correlation with energy emissions in the gamma radiation spectrum.



It is clearly shown that the older a person, the lower his own gamma radiation power is. Reduction of human energy emission in the gamma radiation spectrum is concurrent with the process of human bone tissue decomposition. Inspite of its relative stability, human bone tissue changes in time by losing its density and mass.

In women and men, this process starts after the age of 30-35 years. In men, the rate of bone mass loss is 0.3 – 0.5% per year. In women it is 0.7-1.3% per year before menopause, up to 2-3% per year during menopause and then the average rate of bone mass loss in women is 1% per year.



THE DYNAMICS OF THE MINERAL COMPOSITION OF THE BONE TISSUE:

WOMEN AGED 21-85

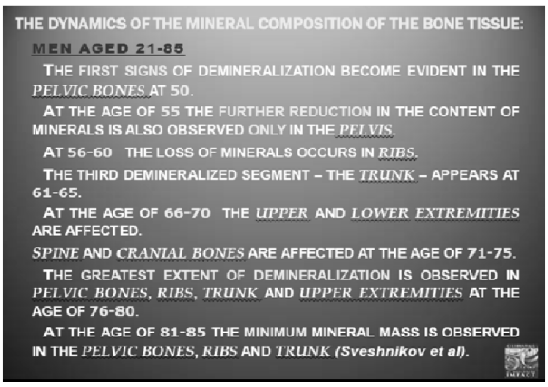
THE PERCENTAGE OF MINERALS (PM) AT THE AGE OF 51-55 REDUCES IN THE *TRUNK, RIBS, SPINE,* AND *PELVIC BONES*.

AT THE AGE OF 56-60, THE PM REDUCES SIGNIFICANTLY IN *RIBS, PELVIC BONES* AND *TRUNK*. THE PM IS PRACTICALLY UNCHANGED IN THE CRANIAL BONES AND EXTREMITIES.

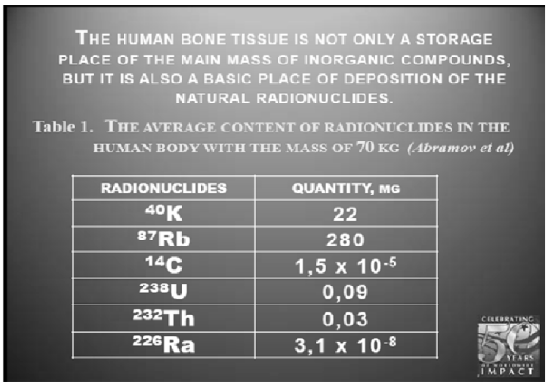
AT THE AGE OF 66-70, THE PM REDUCES THE MOST HEAVILY IN *RIBS* AND *PELVIC BONES*.

AT 76-80, THE MOST ESSENTIAL LOSS OF MINERALS TAKES PLACE IN *THE SPINE*.

AT THE AGE OF 81-85 THE MINIMUM MASS OF MINERALS IS OBSERVED IN *RIBS, SPINE, PELVIC BONES* AND *LOWER EXTREMITIES (Sveshnikov et al)*.



As human bone reduces its density with age it loses elasticity and plasticity. Bone is both a place where the bulk of inorganic compounds are concentrated and also the principal deposition of natural radionuclides. The human skeletal system is the deposition of 90% of soluble radionuclides and are eliminated in the urine.



The remaining non soluble radionuclides are deposited in the upper respiratory tract in 99% of cases. Therefore it is from the skeletal system where 90% of the natural radionuclides are distributed, a low energy nuclear reaction occurs.

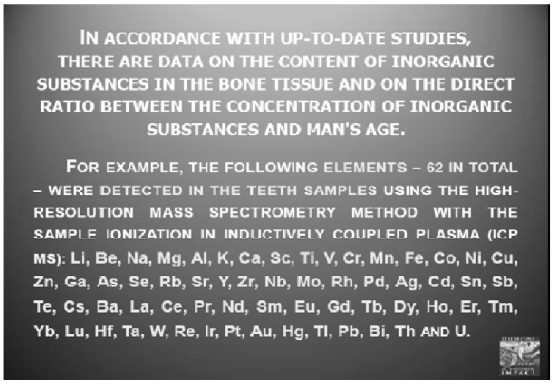
The skeletal system thus acts as

1. **A deposition for natural radioisotopes.**
2. **A low energy nuclear reactor.**
3. **Functionally a shell of the human nuclear reactor.**

4. A deposition of many inorganic compounds which are transformed into necessary radionuclides for a human body, influenced by human radiation.

This is the main reason for losing elasticity and plasticity and for deformation of the human skeleton in time like a nuclear reactor shell.

Inorganic substances that make up 21.85% of bone tissue include Calcium salts (87%), Magnesium phosphate (2%), Calcium carbonate (10%), Calcium fluoride, Sodium carbonate, Carbon dioxide, Sodium chloride, Selenium, Phosphorus, Sulfur, Potassium, Iron, Copper, Zinc, Strontium and numerous trace elements.



Star Dust has a main effect of maintaining human radioactivity at an adequate level and replenishment of inorganic elements in the form of special composition of stable isotopes.

Human energy emission in the gamma quantum spectrum reduces with age and the human is insufficiently cooled. The human brain structure suffers first because intracranial space is an enclosed area of a human body.

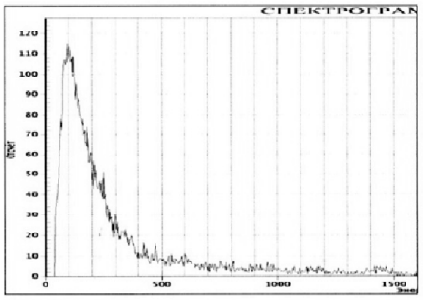
In the first instance slight heating of the intracranial space influences endocrine glands located in the brain – pituitary, hypothalamus and pineal. Increase in the temperature range even by tenths of a degree is critical for these endocrine glands changing blood hormone profiles with hormone imbalance. The process of aging speeds up.

The organism is heated as there is no heat removal, the human electromagnetic radiation reduces because density and elasticity of bone tissue has been reduced, walls of the human low energy nuclear reactor cannot sustain the loads that they used to sustain at the age of 25 years.

Concurrently, the quantity of inorganic elements contained in the bone tissue is reduced steadily which are the strategic reserves for maintaining the low energy nuclear reactor. The human reactor dies out, the energy leaves and life goes away with the energy.

Energy is of the non-material world. As soon as energy leaves a human, material biological life stops.

Figure No. 6. Spectrogram of life of an average human at natural air radioactivity.

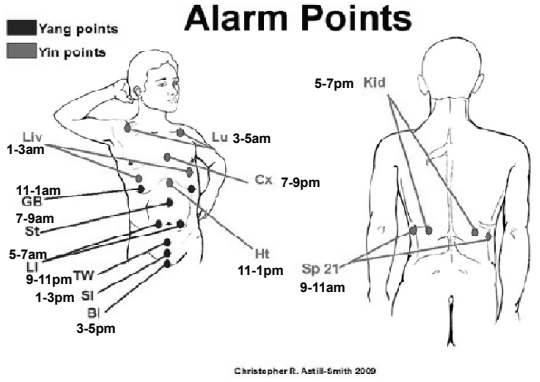


The "Star Dust" (SSH&H) is a product of special processing of diamonds, rubies, emeralds, amethysts, and other natural gemstones. As far as I understood the explanation of manufacturing process there is a special apparatus located very deep under the ground where the above mentioned gemstones are divided into radionuclides, which – in turn – are separated into biologically stable or inactive radionuclides and biologically unstable or active radionuclides. Measurement of the radiation level is compulsory. This level must be equal or below of the general background of the biological environment.
You have got vials with simplified radionuclide composition derived from three minerals (calcite (calcium carbonate) fluorite (calcium fluoride), garnet (silica)).

Clinical Application

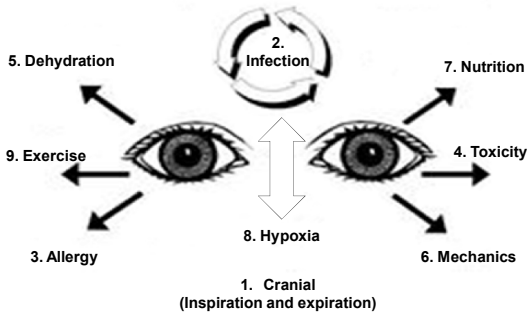
Clinical application1
1. TL Umbilicus
2. Cross TL to all the meridian Alarm points staring with the LI. There should be 2 positives
3. Challenge which one negates with eyes down. This is the genotype expressing the unconscious emotion. The other maybe considered the phenotype.

Alarm Points



4. Identify the weak associated muscle to the genotype meridian and use this on all testing on this meridian.
5. Do all eye positions to identify etiology and identify all nutrients / herbals / spices etc that strengthen this muscle
6. Assess exact dose by cross TL to the meridian Alarm point

Eyes into Distortion (EID)

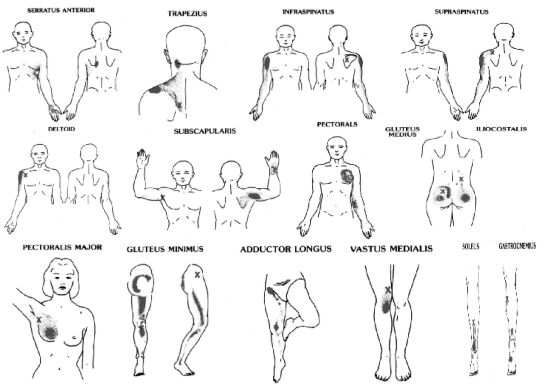


7. Repeat eye position challenge after each positive until no further treatment required.

8. Find trigger point in genotype muscle and treat accordingly.

9. Prescribe VEP spray for genotype meridian.

NOTE ANY POSITIVE NUTRIENTS / HERBALS / SPICES MUST STRENGTHEN BOTH THE PHENOTYPE AND GENOTYPE MUSCLES. SOMETIMES THERE MAYBE A NUMBER OF PRODUCTS.



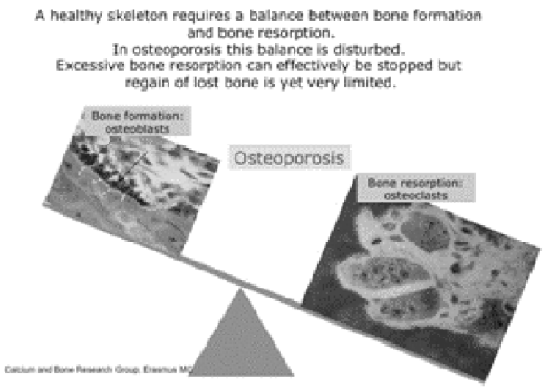
Evans and Rosenburg in 1965 from Tufts University measured 10 biomarkers of aging by a 23 page life style questionnaire.

1. Muscle mass **2. Strength**
3. Basal met rate **4. Body fat**
5. Aerobic capacity **6. BP**
7. Blood sugar tolerance
8. Cholesterol / HDL ratio
9. Bone density10. Body temperature

More recently there were two research programs undertaken at Tuft's University. One with women and one with men. Both studies showed independently that there was just one technique that could reverse all these signs of aging. It takes just 10-20 minutes per day 4x a week.

Osteoporosis

Osteoporosis is painful both physically and emotionally. It doesn't matter if you are a teenager or an adult, osteoporosis can largely be prevented.

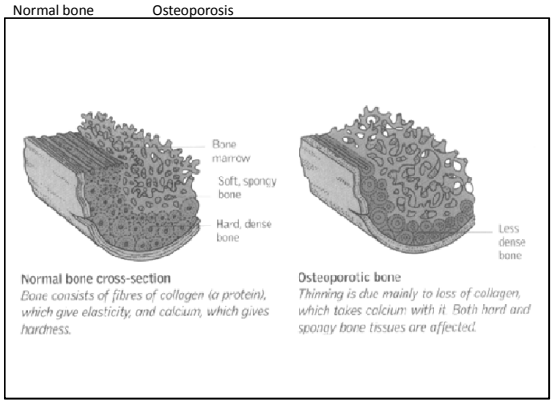


Osteoporosis means "porous bones" (bones with holes) so brittle that they can fracture from the force than nothing more than a sneeze.

Osteomalacia means "soft bones".

Osteopenia means low bone mass.

Normal bone Osteoporosis



Bone contains both organic and inorganic material. The principal proteins of bone are:-
Collagen Type 1 is the major protein comprising 90-95% of the organic material.
Collagen Type V is present in small amounts.
Other non-collagen proteins.

The inorganic or mineral component is mainly hydroxyapatite (Ca10(PO4)6(OH2) along with Sodium, Magnesium, Potassium, iron, Copper, Zinc, Strontium, Selenium, Sulfur, Chlorine, Phosphate, Carbonate and Fluoride. Approximately 99% of the body's calcium is contained in bone.

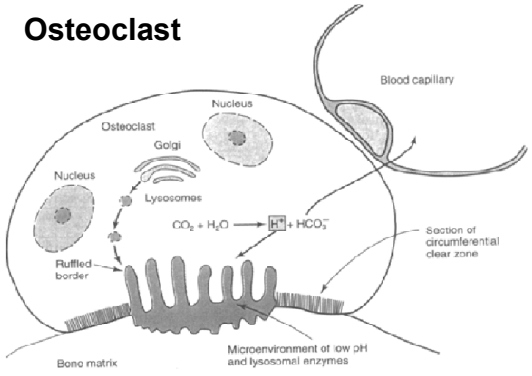
The major cell types involved with bone resorption are the osteoclasts.

Osteoblasts are involved with the deposition of bone.

Osteoclasts are multinucleated cells derived from pluripotent hemopoietic stem cells.

Osteoclasts possess an apical membrane domain exhibiting a ruffled border that plays a key role in bone resorption.

Osteoclast

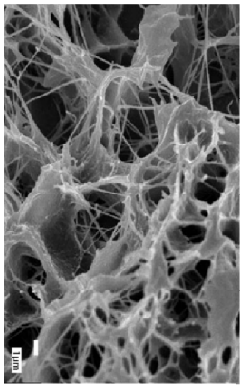


The principal proteins found in bone.

Proteins	Comments
Collagens	
Collagen type I	Approximately 90% of total bone protein. Composed of two α1(I) and one α2(I) chains.
Collagen type V	Minor component.
Noncollagen proteins	
Plasma proteins	Mixture of various plasma proteins.
Proteoglycans	
CS-PG I (biglycan)	Contains two GAG chains; found in other tissues.
CS-PG II (decorin)	Contains one GAG chain; found in other tissues.
CS-PG III	Bone-specific.
Bone SPARC protein (osteonectin)	Not bone-specific.
Osteocalcin (bone Gla protein)	Contains γ-carboxyglutamate residues that bi… hydroxyapatite. Bone-specific.
Osteopontin	Not bone-specific. Glycosylated and phosphorylated.
Bone sialoprotein	Bone-specific. Heavily glycosylated, and sulfated on tyrosine.
Bone morphogenetic proteins (BMPs)	A family (eight or more) of secreted proteins with a variety of actions on bone; many induce ectopic bone growth.

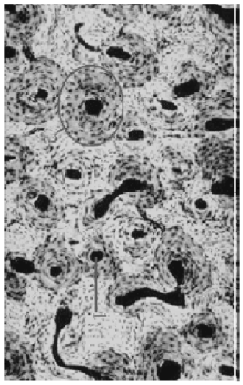
Stimulated by copper dependant IGF-1

Type 1 Collagen appears to be necessary, with mineralization being first evident in the gaps between successive molecules.

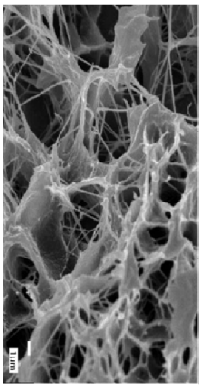


The skeleton is made up of two sorts of bone. About 80% is cortical (compact) bone which is hard, dense and stiff. It makes up the outer shell of most bones including the long bones of the arms and legs. It is designed to stand load bearing stresses.

Spongy trabecular bone is found inside the cortical castings, in the vertebrae, at the ends of the long bones and in parts of the pelvic bones.



It is estimated that approximately 4% of cortical (compact) bone is renewed annually in the typically healthy adult, whereas approximately 20% of trabecular bone is replaced.



Throughout childhood and into young adulthood, bone formation outpaces resorption, so that you get taller as your bones get longer and your bones also get wider and denser.

However the homeostasis between osteoblasts and osteoclasts becomes uncoupled around the age of 35 years and bone breakdown then outpaces bone formation ultimately leading to osteoporosis.

Phase 1. Half of all bone is made during the teen years. At skeletal maturity the bones will continue to increase in bone mass as long as formation stays ahead of resorption.

At Tufts Aging Centre a group of young women runners were compared with that of women who did no regular exercise.

Even though they were 20% lighter than the non-runners, the runners still had stronger leg bones.

Research also showed that the runner's forearm bones were also denser, despite the fact that these bones are non-weight bearing. Somehow the whole skeleton shared the message to deposit more calcium into the bone tissue probably via the hormonal system triggered by gravity.

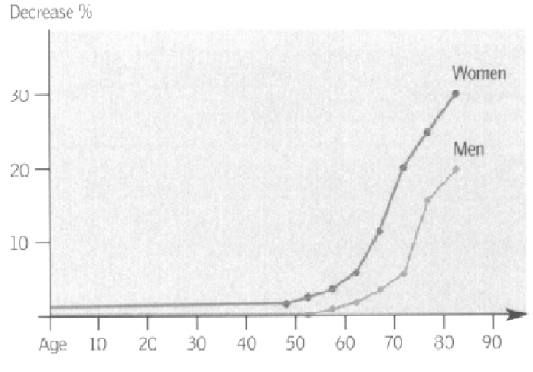
By aged 20 years 90% of bone mass is set and peak bone density is by mid to late 20's.

Phase 2. Plateau phase lasts for about 10 years!

Phase 3. By the age of 35 years there is a slow decline in bone mass. 0.5 to 1% per year. Resorption proceeds faster than deposition.

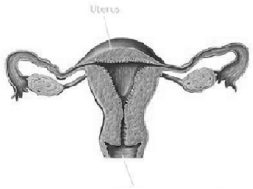
Post-menopausal women experience a sharp increase in bone loss for the first 5-10 years after menopause increasing to 3-5% loss each year thought to be due to a combination of lower progesterone and estrogen levels.

Bone loss with age



Women who have undergone surgical menopause (loss of ovaries) lose twice as much bone as other women at menopause because even post-menopausal the ovaries continue to produce a small amount of estrogens and other hormones.

Interestingly,



who had a hysterectomy and their ovaries bone at an accelerated rate (though not as quickly as women with no ovaries) thought probably due to the uterus making Vit D. (activated form)

Phase 4. Eventually the rate of bone loss in women slows again to about 1% a year throughout the rest of their lives, putting men and women on an equal footing by that point.
But by then rate of bone formation is also slowing down.

Functional Test

Weak muscle strengthens to bone meal.

Strong muscle weakens to phosphorus?

Toxic metals

1. Lead interferes with progesterone leading to decrease in osteoblastic activity.

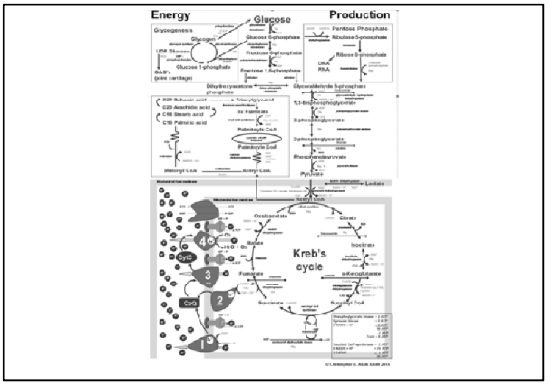
2. Cadmium increases the rate of calcium excretion. High cadmium in cigarette smoke and fertilizers.

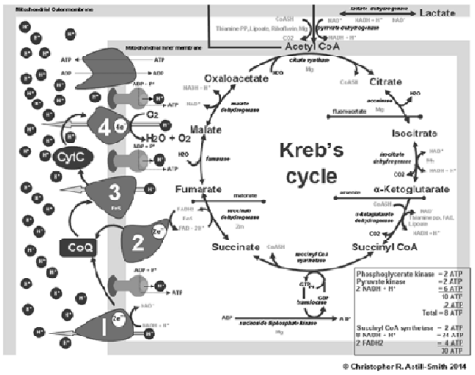
3. Tin is deposited into bone interfering with normal remodeling. The higher the tin the greater the need for zinc and copper to chelate. Tin inhibits HCl stomach secretion leading to insufficient mineral absorption. (Generally there is lower tin intake these days and also lower stomach cancer!)

Mitochondria

There are on average 1500 mitochondria in every body cell with the exception of the red blood cells. In heart muscle cells they average 2000 and in nerve cells up to 5000. In the heart, mitochondria account for 70% of its weight. When mitochondria cannot work normally, the production of energy is by mitochondria is disrupted.

The energy ATP is no longer produced with the assistance of oxygen but outside the mitochonfria in the cytoplasm and without oxygen by glycolysis or in less serious disruptions with oxygen but without the production of oxygen radicals.





In the process the differentiated cell performances of all organelle systems are no longer maintained but instead the cell division cycle is activated.
The word "Mitochondria" comes from the Greek *mitos* meaning thread and *chondros* meaning grain.

90% of the oxygen we inhale is required in mitochondria for the modulation of energy. This form of energy production within the mitochondria is termed "high performance energy". This energy is not only heat energy but more importantly information energy with driving functions.

In the "high performance model" reactive oxygen radicals are always and unavoidably formed which can damage potential cells and mitochondria. If they are not neutralized, cell or mitochondria membrane components or genetic fragments could be damaged or destroyed. An up to 80% loss of mitochondria occurs in cancer cells.

Free radicals like oxygen and NO gas play an important role in the defence against tumour cells and pathogen, proliferating within cells and is a completely normal physiological process.
Sulfur compounds are decisive for neutralizing these radicals such as reduced glutathione and sulfur containing foods.

If in the production of mitochondrial energy the accumulating oxygen radicals or industrial toxins can non longer be quenched, they can potentially cause serious damage at a cellular level. In order to protect themselves from this the mitochondria reduce their activities.

In doing so there are fewer oxygen radicals produced but the consequence is a drop in system cell performance. Dr Kremer called this process the "protective switch". Here the energy production is switched from the mitochondria to the cytoplasm.

Natural substances can absorb and emit photons above certain wavelengths in the near UV range and in the visible spectrum.
A new enzyme class called sirtuin (silent information regulators) has been discovered that mute certain genes and molecules by removing an activating molecular group in all Eukarya.

The sirtuin enzymes are activated by particular natural substances from the large family of vegetable polyphenols. Sirtuin enzymes have been detected in the nuclei, cytoplasm and mitochondria of humans..

Photon absorbing vegetable polyphenols activate the O2 dependent mitochondrial activity via multiple networked regulatory cycles.

Polyphenols cannot be synthesised by mammals which is why they have characteristics of vitamins. They are essential for intact mitochondrial function, systemic diseases and premature aging.

If the electron flow in Complex 4 of the respiratory chain to O2 is permanently disturbed then a failure in the modulation of ATP occurs and increasing numbers of oxygen and other radicals form that can attack and damage the macromolecules (nucleic acids, proteins, lipids).

In order to prevent this danger the key enzyme *hemeoxygenase* up-regulates. The enzyme uses O2 as co-factor for the production of carbon monoxide (CO). In cases of long-term surplus production CO gas has crucial effects on cell transformation.

***Hemeoxygenase* is an enzyme that catalyzes the degradation of heme. This produces biliverdin, iron, and carbon monoxide. It cleaves the heme ring at the alpha-methene bridge to form either biliverdin or, if the heme is still attached to a globin, verdoglobin.**

1. CO gas effects a characteristic phase shifting of the absorption of visible light from components of the respiratory chain and as a result short circuits the photon switch for the modulation of the information transfer to the mitochondrial ATP.

2. CO activates in the cytoplasm certain regulatory proteins for the stimulation of cell division cycle without external growth signals.
3. CO effects overstimulation of cGMP
4. CO gas blocks programmed cell death by bonding onto the bivalent iron in important key enzymes.

When O2 is deficient the even more effective cyanide gas (CN^-) is formed instead of CO.

CN^- is in humans the strongest mitochondrial respiratory poison and produces a stronger phase switching of the absorption of visible light.

In 2003 researchers from the Anderson Cancer Research centre at the University of Houston published the first wide ranging overview about the hundreds of animal experiments on the effects of curcumin the active ingredient of turmeric on cancer cells and metastases.

Curcumin effectively inhibited nearly all signal paths in tumour cells and metastases. The actions curcumin can be explained by the fact that curcumin in the violet spectral range of visible light absorbs with nearly the same wavelength - 415mm- as the electron transforming molecule cytochrome c that is more rapidly

broken up by the protective enzyme heme oxygenase in cancer cells. In cancer cells curcumin, bridges the III and IV complex photon switch "short circuit" of the respiratory chain in mitochondria and thus normalizes the information transfer for maintaining modulation of ATP.

There is a broad spectrum of classes of substances responding to natural light available and the potential is by no means exhausted.

NB. Use only Organic Turmeric as non – organic contains pesticides that inhibit the mitochondrial respiratory chain.
e.g. Pyrethroids, Carbendazim

Toxic metals, Chemicals, Radiation

⇩

Reactive Oxygen Species

⇩

Inhibit Complex 4

⇩

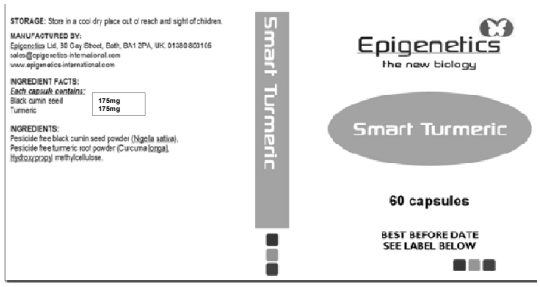
Hemeoxygenase

O_2 ⇙ ⇘ CN^-

CO

↓ Absorption of visible light.
↑Cell division, ↑cGMP, ↓Apotosis

New Product
SMART Turmeric



Types of Calcium Supplements

1. **Calcium sulfate**
2. **Calcium citrate**
3. **Calcium Magnesium citrates**
4. **Calcium lactate**
5. **Calcium phosphate**
6. **Calcium fluoride**

Oxalates and Phytates

Oxalate foods – asparagus, spinach, parsley, chives, green beans, sorrel, rhubarb, swiss chard, summer squash.

Phytate foods – oats, wheat-bran, dried beans, dried peas

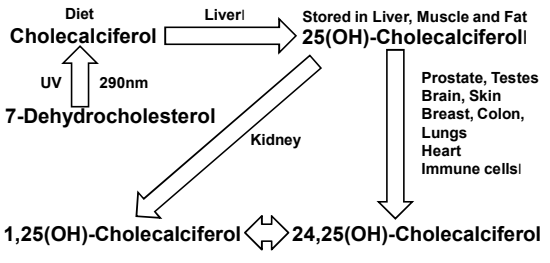
Calcium can interfere with iron absorption so supplement at different times.

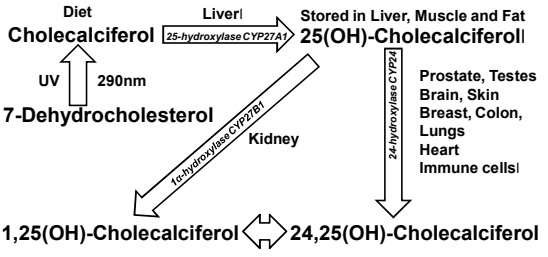
Calcium can interfere with the following medications –
Thyroxin
Some antibiotics
Anticonvulsants
Corticosteroids

Other important bone building nutrients:-

Vitamin D

Calciferol

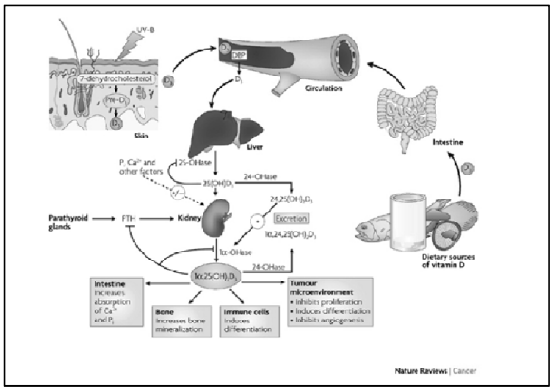




Calcium
Muscle and Bone health
Regulation of PTH production

Immunomodulation
Prevention of Autoimmune diseases (M/S, R/A, Type 1 Diabetes),
Prevent Infections

Regulation of Cell Growth (Cancer prevention),
Improve mental health,
Regulation of BP,
Anti-inflammatory



Vitamin D is not really a vitamin since it can be synthezied in the skin but more of a hormone, and under most conditions that is the major source of the vitamin.
Only when sunlight exposure is inadequate is a dietary source required.

In humans, the most important compounds are vitamin D_3 (also known as cholecalciferol) and vitamin D_2 (ergocalciferol)

Its main function is in the regulation of calcium, magnesium, iron, phosphate and zinc absorption and homeostasis, most of its actions are mediated by of nuclear receptors that regulate gene expression.

In the liver, cholecalciferol (vitamin D_3) is converted to calcidiol, which is also known as 25-hydroxycholecalciferol, or 25-hydroxyvitamin D_3 — abbreviated.$25(OH)D_3$. Ergocalciferol (vitamin D_2) is converted in the liver to 25-hydroxyvitamin D_2 — abbreviated $25(OH)D_2$.

These two specific vitamin D metabolites are measured in serum to determine a person's vitamin D status.

Part of the 25(OH)D3 (calcidiol) is converted by the kidneys to 1,25(OH)D3 (calcitriol), the biologically active form of vitamin D.

1,25(OH)D3 (Calcitriol) circulates as a hormone in the blood, regulating the concentration of calcium and phosphate in the bloodstream and promoting the healthy growth and remodeling of bone.
1,25(OH)D3 (Calcitriol) also affects neuromuscular and immune function.

Sun exposure
1. 1 MED (Minimal Erythermal Dose) enough sun time to give a slight pinkness to the skin.
2. Up to 20,000IU often within 30 minutes depending on skin tone.
3. No lotion. SPF 15 blocks 95%, SPF 30 and above blocks 99%.
4. Aim for 20mins of 40% skin exposure per day.

September 21st to March 21st no UVA so no Vit D produced. Solely reliant upon summer production and dietary intake.
Vitamin D slowly released from fat stores over the winter.
Sunshine Vitamin D half life is 6 weeks.

Darker skin. More melanin = less Vitamin D production
Obesity – Vitamin D stored in adipose tissue (up to 40% more Vitamin D required)
Elderly – Partly less sun exposure and reduced skin ability to synthesise Vitamin D.

Optimal levels

<25nmol/L (10ng/ml) Deficient

50-87.4 nmol/L (20-35ng/ml) Insufficient

125-250nmol/L (50-100ng/ml) Optimal

45 year olds across the UK between 2002-2004
Using <75nmol/L as reference range.

Nearly 90% of subjects deficient in the winter.

60% of subjects deficient all year.

Common Clinical Symptoms
Low back pain
Diffuse body aches and pains
Growing pains
Tender bones on palpation
Shin pain
Depression
Fatigue

How does deficiency cause symptoms.

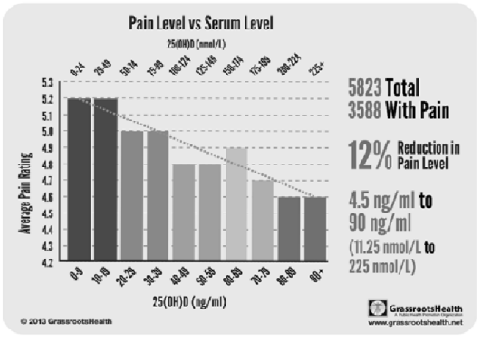
1. **Less calcium absorbed**
   - **i) Increased PTH**
   - **ii) Release of calcium from bone**
   - **iii) Unable to mineralise collagen matrix**
   - **iv) Hydrates and expands periosteal coverings**

How does deficiency cause symptoms.

2. Central hypersensitivity

i) Nociceptors express Vitamin D receptors

ii) Deficiency leads to hyperinnervation of skeletal muscle leading to muscle hypersensitivity and pain.



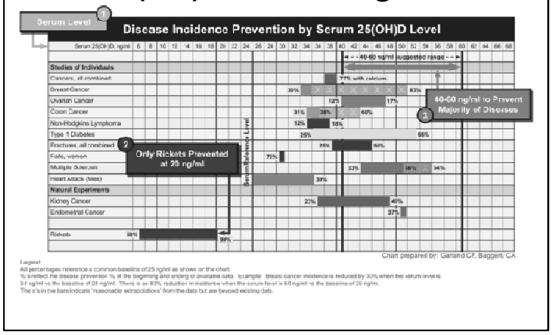
How does deficiency cause symptoms.

3. Pro-inflammatory state

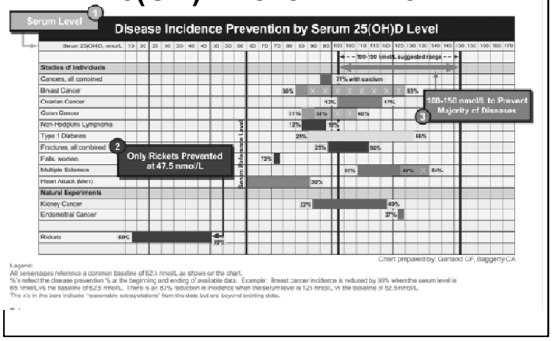
i) Deficiency shown to create higher scores on Severity Scale for Somatic Symptoms (SSS)

ii) Vitamin D shown to reduce hs-CRP levels

25(OH)D Level in ng/ml

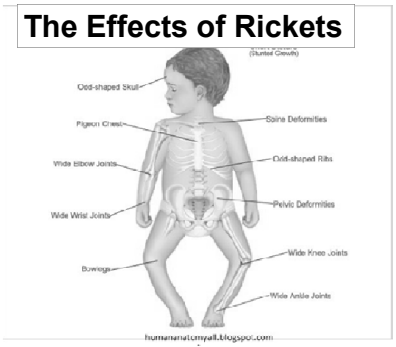


25(OH)D Level in nmol/L



Rickets, a childhood disease, is characterized by impeded growth and soft, weak, deformed long bones that bend and bow under their weight as children start to walk. This condition is characterized by bow legs,which can be caused by calcium or phosphorus deficiency, as well as a lack of vitamin D

The Effects of Rickets



Osteomalacia is a disease in adults that results from vitamin D deficiency. Characteristics of this disease are softening of the bones, leading to bending of the spine, bowing of the legs, proximal muscle weakness, bone fragility, and increased risk for fractures.

Osteomalacia reduces calcium absorption and increases calcium loss from bone, which increases the risk for bone fractures. Osteomalacia is usually present when 25-hydroxyvitamin D levels are less than about 10 ng/mL. The effects of osteomalacia are thought to contribute to chronic musculoskeletal pain.

Vitamin D toxicity is rare. The threshold for vitamin D toxicity has not been established. Vitamin D toxicity is not caused by sunlight exposure, but can be caused by supplementing with very high doses of vitamin D.

In healthy adults, sustained intake of more than 1250 µg/day (50,000 IU) can produce overt toxicity after several months and can increase serum 25-hydroxyvitamin D levels to 150 ng/ml and greater.

Hypercalcemia is a strong indication of vitamin D toxicity, noted with an increase in urination and thirst. If hypercalcemia is not treated, it results in excess deposits of calcium in soft tissues and organs such as the kidneys, liver, and heart, resulting in pain and organ damage.

Exposure to sunlight for extended periods of time does not normally cause vitamin D toxicity. Within about 20 minutes of ultraviolet exposure in light-skinned individuals the concentrations of vitamin D precursors produced in the skin reach an equilibrium, and any further vitamin D produced is degraded.

Name	Chemical composition
Vitamin D1	molecular compound of ergocalciferol with lumisterol,
Vitamin D2	Ergocalciferol (made from ergosterol)
Vitamin D3	Cholecalciferol (made from 7-dehydrocholesterol in the skin)
Vitamin D4	22-dihydroergocalciferol
Vitamin D5	sitocalciferol (made from 7-dehydrositosterol)

Vitamin D_3 (cholecalciferol) is produced through the action of ultraviolet irradiation (270-300nm) on.its.precursor 7-dehydrocholesterol. Human skin makes vitamin D_3 and supplies about 90% of vitamin D. This molecule occurs naturally in the skin of animals and in milk.

Vitamin D_3 can be made by exposure of the skin to UV, or by exposing milk directly to UV (one commercial method). Vitamin D_3 is also found in oily fish and cod liver oil.

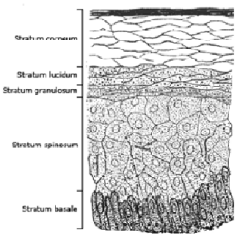
Vitamin D_2 is a derivative of ergosterol, which is produced by some kinds higher fungi such as mushrooms. The vitamin ergocalciferol (D_2) is produced from ergosterol, in response to UV irradiation.diet.

The biological fate for producing 25(OH)D from vitamin D_2 is expected to be the same as for 25(OH)D_3, although some controversy exists over whether or not D_2 can fully substitute for vitamin D_3 in the human diet.

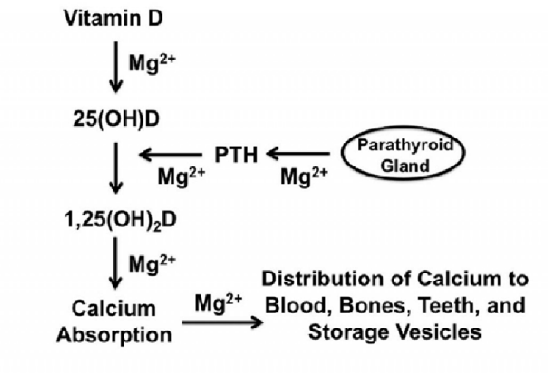
Dehydrocholesterol reacts with UVB,light at wavelengths between 270 and 300 nm, with peak synthesis occurring between 295 and 297 nm.
These wavelengths are present in sunlight, as well as in the light emitted by the UV lamps in tanning beds.

Exposure to light through windows is insufficient because glass almost completely blocks UVB light.

In the epidermal strata of the skin, production is greatest in the stratum basale (coloured red in the illustration) and stratum spinosum (coloured light brown).



Sunscreen absorbs ultraviolet light and prevents it from reaching the skin. Sunscreen with a sun protection factor (SPF) of 8 based on the UVB spectrum has been reported to decrease vitamin D synthetic capacity by 95%, whereas sunscreen with an SPF of 15 can reduce synthetic capacity by 98%.



Vitamin D 25-hydroxylase **is a member of the cytochrome P450 superfamily of enzymes. An inherited mutation in the *CYP2R1* gene which eliminates the enzyme activity and is associated with low circulating levels of 25-hydroxyvitamin D and classic symptoms of vitamin D deficiency.**

Calcidiol is transported to the proximal tubules of the kidneys, where it is hydroxylated at the 1-α position to form calcitriol (1,25-dihydroxycholecalciferol and abbreviated to $1,25(OH)_2D$). This product is a potent ligand of the vitamin D receptor, which partly mediates the physiological actions of the vitamin.

The conversion of calcidiol to calcitriol is catalyzed by the enzyme *25-hydroxyvitamin D_3 1-alpha-hydroxylase*, the levels of which are increased by parathyroid hormone (and additionally by low calcium or phosphate) and modulated by magnesium.

***25-Hydroxyvitamin D_3 1-alpha-hydroxylase* is also known as cytochrome p450 (CYP27B1). is located in the proximal tubule of the kidney and a variety of other tissues, including skin (keratinocytes), immune cells, and bone (osteoblasts).**

Calcidiol + NADPH + H_+ + O2 = Calcitriol + NADP + H2O

The active vitamin D metabolite calcitriol mediates its biological effects by binding to the vitamin D receptor (VDR), which is principally located in the nuclei of target cells.

The binding of calcitriol to the VDR allows the VDR to act as a transcription factor that modulates the gene expression of transport proteins (such asTRPV6 and calbindin), which are involved in calcium absorption in the intestine.

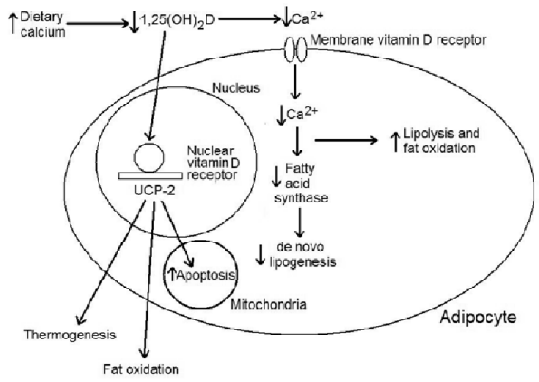
The vitamin D receptor belongs to the nuclear receptor superfamily of steroid/thyroid hormone receptors, and VDRs are expressed by cells in most organs, including the brain, heart, skin, gonads, prostate, and breast.

VDR activation in the intestine, bone, kidney, and parathyroid gland cells leads to the maintenance of calcium and phosphorus levels in the blood (with the assistance of parathyroid hormone and calcitonin) and to the maintenance of bone content.

One of the most important roles of vitamin D is to maintain skeletal calcium balance by promoting calcium absorption in the intestines, promoting bone resorption by increasing osteoclast number, maintaining calcium and phosphate levels for bone formation, and allowing proper -

functioning of parathyroid hormone to maintain serum calcium levels. Vitamin D deficiency can result in lower bone mineral density and an increased risk of reduced bone density (osteoporosis) or bone fracture because a lack of vitamin D alters mineral metabolism in the body.

Osteoclasts reabsorb bone.
Osteoblasts form bone.



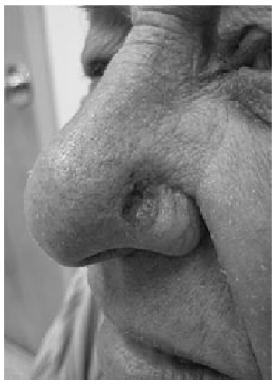
Thus, although it may initially appear paradoxical, vitamin D is also critical for bone re-modeling through its role as a potent stimulator of bone resorption.
The VDR is known to be involved in cell.proliferation and differentiation.

Vitamin D also affects the immune system, and VDRs are expressed in several white blood cells, including monocytes, macrophages and activated T and B cells.
Vitamin D increases expression of the *tyrosine hydroxylase* gene in adrenal medullary cells.

It also is involved in the biosynthesis of neurotrophic factors, synthesis of nitric oxide synthase, and increased glutathione levels.
An alternative action is its role as a natural inhibitor of signal transduction by hedgehog (a hormone involved in morphogenesis).

The Hedgehog.\signaling pathway is a signaling pathway that transmits information to embryonic cells required for proper development. The pathway has roles in the adult. Diseases associated with the malfunction of this pathway include basal cell carcinoma.

Basal-cell carcinoma or basal cell cancer (BCC), a skin cancer, is the most common cancer. It.rarely metasta sizes or kills.



Age	Minimum	Maximum
0-1 year	5mcg 200IU	25mcg 1000IU
1-18 years	5mcg 200IU	100mcg 4000IU
19-50 years	5mcg 200IU	100mcg 4000IU
51-70 years	10mcg 400IU	100mcg 4000IU
70 + years	15mcg 600IU	100mcg 4000IU
Pregnancy / Lactation	45mcg 600IU	100mcg 4000IU

Hearney and Holick contend the human physiology is fine-tuned to an intake of 4,000–12,000 IU/day from sun exposure with concomitant serum 25-hydroxyvitamin D levels of 40 to 80 ng/ml (100-200 nmol/l) and this is required for optimal health.

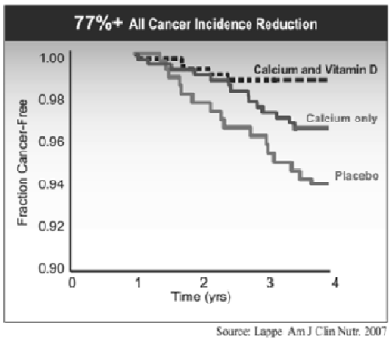
(1 ng/ml = 2.5 nmol/l)

A serum 25-hydroxyvitamin D level of 20-50 ng/ml (150 nmol/l) is desirable for bone and overall health.

The risk of cardiovascular disease is lower when vitamin D ranged from 8-24 ng/ml (20 to 60 nmol/l).

Allowable health claims
Normal function of immune system
Normal inflammatory response
Normal muscle function
Reduced risk of falling >60's
May reduce osteoporosis
Helps build stronger bones in children

Health benefits
Cancer
Cardiovascular disease
Hypertension
Diabetes
Mortality
Bone health
Multiple sclerosis
Immune system
Muscle function. Inflammatory response



Sources
Vitamin D2 – Mushrooms exposed to UV
Alfalfa
Coco husks

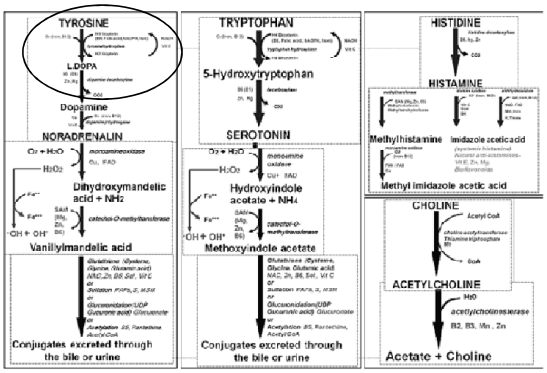
Vitamin D3 –Fish liver oil
Oily fish
Whole egg
Beef liver

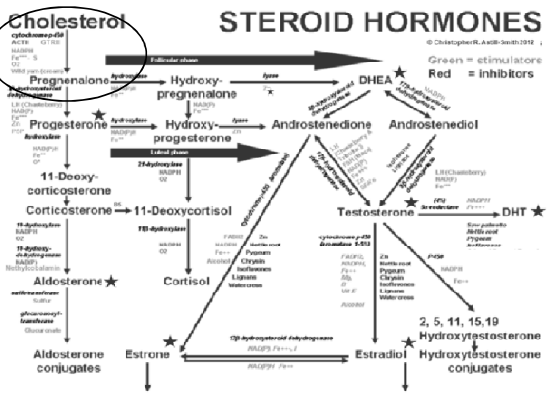
Serum concentration of 25(OH)D is the best indicator of vitamin D status. It reflects vitamin D produced cutaneously and that obtained from food and supplements and has a fairly long circulating half-life of 15 days.

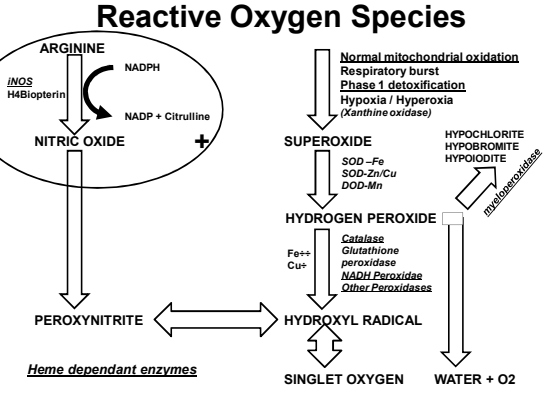
25(OH)D functions as a biomarker of exposure, but it is not clear to what extent 25(OH)D levels also serve as a biomarker of effect (i.e., relating to health status or outcomes).
Serum 25(OH)D levels do not indicate the amount of vitamin D stored in body tissues.

In contrast to 25(OH)D, circulating $1,25(OH)_2D$ is generally not a good indicator of vitamin D status because it has a short half-life of 15 hours and serum concentrations are closely regulated by parathyroid hormone, calcium, and phosphate. Levels of $1,25(OH)_2D$ do not typically decrease until vitamin D deficiency is severe.

Enzymes that are induced by Vitamin D


TYROSINE
L-DOPA
Dopamine
NORADRENALIN
Dihydroxymandelic acid + NH2
Vanillylmandelic acid
Conjugates excreted through the bile or urine
TRYPTOPHAN
5-Hydroxytryptophan
SEROTONIN
Hydroxyindole acetate + NH4
Methoxyindole acetate
Conjugates excreted through the bile or urine
HISTIDINE
HISTAMINE
Methylhistamine
Imidazole aceticacid
Methyl imidazole acetic acid
CHOLINE
ACETYLCHOLINE
Acetate + Choline


STEROID HORMONES
Cholesterol
Green = stimulatore
Red = inhibitors
Pregnenalone
Hydroxy-pregnenalone
DHEA
Progesterone
Hydroxy-progesterone
Androstenedione
Androstenediol
11-Deoxy-corticosterone
Corticosterone
11-Deoxycortisol
Testosterone
DHT
Aldosterone
Cortisol
2, 5, 11, 15,19 Hydroxytestosterone
Aldosterone conjugates
Estrone
Estradiol
Hydroxytestosterone conjugates


Reactive Oxygen Species
ARGININE
iNOS
H4Biopterin
NADPH
NADP + Citrulline
NITRIC OXIDE
+
PEROXYNITRITE
Heme dependant enzymes
Normal mitochondrial oxidation
Respiratory burst
Phase 1 detoxification
Hypoxia / Hyperoxia
(Xanthine oxidase)
SUPEROXIDE
SOD –Fe
SOD-Zn/Cu
DOD-Mn
HYDROGEN PEROXIDE
Fe++
Cu+
Catalase
Glutathione peroxidase
NADH Peroxidae
Other Peroxidases
HYDROXYL RADICAL
SINGLET OXYGEN
WATER + O2
HYPOCHLORITE
HYPOBROMITE
HYPOIODITE
myeloperoxidase

Enzymes that are induced by Vitamin D
Tyrosine hydroxylase
Tryptophan hydroxylase
Cholesterol to pregnenalone
Nitric oxide synthase
Increases Glutathione levels

New product SMART Vitamin D
Liquid Vitamin D in a base of Organic Black cumin seed oil 30ml dropper bottles. Each drop delivers 1000IU (25mcg) Vitamin D3 (Cholecalciferol). 440 doses per bottle.
Price £13.29 (inc VAT) +3p per drop
Competitor price 0.9p per drop of 170IU (3.5mcg) in sunflower oil

Vitamin K

Vitamin K is a group of structurally similar, fat-soluble vitamins the human body needs for complete synthesis of certain proteins that are required for blood coagulation, and also certain proteins that the body uses to manipulate binding of calcium in bone and other tissues.

The Vitamin K related modification of the proteins allows them to bind calcium ions, which they cannot do otherwise. Without vitamin K, blood coagulation is seriously impaired, and uncontrolled bleeding occurs.

Low levels of Vitamin K also weaken bones and promote calcification of arteries and other soft tissues.

Chemically, the vitamin K family comprises 2-methyl-1,4-naphthoquinone (3-) derivatives. Vitamin K includes two natural vitamers: vitamin K_1 and vitamin K_2. Vitamin K_2, in turn, consists of a number of related chemical subtypes, with differing lengths of carbon side chains made of isoprenoid groups of atoms.

Vitamin K_1, also known as phylloquinone, phytomenadione, or phytonadione, is synthesized by plants, and is found in highest amounts in green leafy vegetables because it is directly involved in photosynthesis.
Animals may also convert it to vitamin K_2.

Vitamin K_2, the main storage form in animals, has several subtypes, which differ in isoprenoid chain length. These vitamin K_2 homologues are called menaquinones, and are characterized by the number of isoprenoid residues in their side chains.

Menaquinones are abbreviated MK-n, For example, menaquinone-4 (abbreviated MK-4) has four isoprene residues in its side chain. Menaquinone-4 is the most common type of vitamin K_2 in animal products since MK-4 is normally synthesized from vitamin K_1 in certain animal tissues (arterial walls, pancreas, and testes).

This homolog of vitamin K_2may have enzyme functions distinct from those of vitamin K_1. Bacteria in the colon can also convert K_1 into vitamin K_2. In addition, bacteria produce a range of vitamin K_2 forms, most notably the MK-7 to MK-11 homologues of vitamin K_2.

All forms of K_2 other than MK-4 can only be produced by bacteria, which use these forms in anaerobic respiration. Menaquinone-7 is different from MK-4 in that it is not produced by human tissue. MK-7 consumption has been shown to reduce the risk of bone fractures and cardiovascular disorders.

Vitamin K_2 as MK-4, but not as MK-7 (and also not vitamin K_1) has also been shown to prevent bone loss and/or fractures in these circumstances:

caused by corticosteroids (e.g., prednisone, dexamethasone, prednisolone),
anorexia nervosa,
cirrhosis of the liver,
postmenopausal osteoporosis,
disuse from stroke,
Alzheimer's disease
Parkinson disease
primary biliary cirrhosis

Vitamin K may regulate bone metabolism: osteocalcin, also called bone Gla protein (BGP), matrix Gla protein (MGP), periostin, and the recently discovered Gla-rich protein (GRP).

Menaquinone-7, which is abundant in fermented soybeans (natto), has been demonstrated to stimulate osteoblastic bone formation and to inhibit osteoclastic bone resorption. In another study, use of MK-7 caused significant elevations of serum Y-carboxylated osteocalcin concentration, a biomarker of bone formation.

MK-7 also completely inhibited a decrease in the calcium content of bone tissue by inhibiting the bone-resorbing factors parathyroid hormone and prostaglandin E_2.

Weston Price was a dentist and scientist in the early part of the 20th century. Practicing dentistry in Cleveland, he was amazed at the poor state of his patients' teeth and the suffering it inflicted.

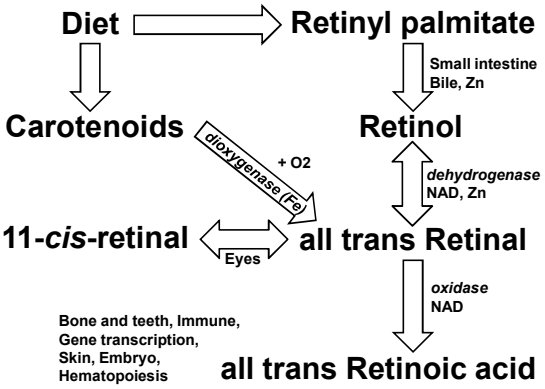
Activator X otherwise known as Factor X or the Wurzen factor (Anti stiffness factor).
Weston Price used extracts from grass-fed butter (activator X), in combination with high-vitamin cod liver oil (A and D), to prevent and reverse dental cavities in many of his patients.

There were three vitamins he found abundantly in the diets of healthy non-industrialized people: A, D, and an unknown substance he called 'activator X'. He considered them all to be synergistic and critical for proper mineral metabolism (tooth and bone formation and maintenance) and general health.

He had a chemical test for activator X, but he didn't know its chemical structure and so it remained unidentified. He found activator X most abundantly in grass-fed butter (but not grain fed!), organ meats, shellfish, insects, and fish eggs.

In 2007 an article for the Weston Price foundation website, claimed to have identified Weston Price's mystery vitamin: as vitamin K2, specifically the MK-4 isoform. However there is absolutely no conclusive scientific evidence that MK4, or K2 for the matter, is activator X. It could be a host of other substances, even a complex.

Vitamin A



Other vitamins to consider

Pyridoxal-5-phosphate
Aids progesterone synthesis
Metabolises homocysteine

RDA 1-25mg

Methylcobalamin
Recycles homocysteine

RDA 1mg

Other nutrients to consider

Vitamin C
Formation and repair of cartilage and collagen in bone
Increases calcium absorption

RDA 1000mg

Other Minerals to consider

Magnesium	**RDA 400mg**
Boron	**RDA 2mg**
Manganese	**RDA 2mg**
Selenium	**RDA 200mcg**
Silicon	**no RDA 1-2mg**

Other nutrients to consider

Zinc

Is used in the creation of osteoblasts and osteoclasts and in bone proteins.
It assists in tissue repair and aids Vitamin D to function.
Aids in progesterone synthesis.

Other nutrients to consider

Copper Slows bone breakdown and assists in repair. Important component of IGF-1.
The total body copper content is 75-150 mg.
Highest copper concentrations are found in the liver, brain, heart and kidneys.

Many factors are involved with the regulation of bone metabolism, some stimulating or inhibiting osteoblasts and others stimulating or inhibiting osteoclasts.

Factors stimulating Osteoblasts

1. **Parathyroid hormone**
2. **1,25-Dihydroxycholecalciferol**
3. **T3 and T4**
4. **HGF and IGF-1**
5. **PgE2**
6. **TGF-β**
7. **Progesterone, DHEA, Testosterone**

Factors inhibiting Osteoblasts

1. Corticosteroids

Factors stimulating Osteoclasts

1. Parathyroid hormone
2. 1,25-Dihydroxycholecalciferol
3. IL-1 and IL-6
4. TNF
5. TGF-α

Factors inhibiting Osteoclasts

1. Calcitonin
2. Estrogens by inhibiting IL-6 production. Ipriflavone, DHEA?
3. TGF-β
4. IFN-α
5. PgE2

Plasma calcium exists in 3 forms

1. **Complexed with organic acids e.g. citrate, phosphate**
2. **Protein bound primarily with albumin**
3. **Ionized at 1.1-1.3 mmol/l is the most biologically active.**

Parathyroid hormone (PTH) increases when plasma Ca++ levels decrease via the stimulation of the conversion of pro-PTH to PTH. Vitamin D acts to decrease this conversion.
PTH synthesis is increased in prolonged hypocalceamia or Vitamin D deficiency.

Calcitonin

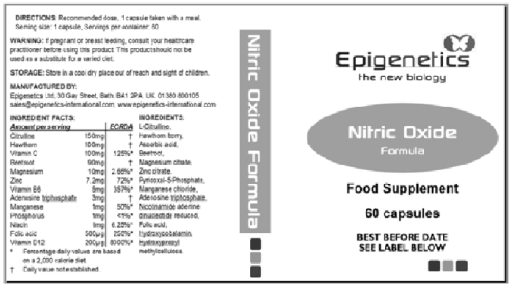
Limits the release of calcium from bones into the blood thus slowing down bone breakdown. Estrogen stimulates its natural production from the thyroid gland. Extracted from salmon.

New product Osteo-Matrix Formula

Teeth

Teeth
Cavities – Calcium fluoride
Wobbly teeth – Vitamin C, Manganese
Receding gums – Folates Silica
Bleeding gums – Pyridoxal-5-phosphate, Bioflavonoids

New product Nitric Oxide Formula



Hair and Nails

Similarities between Hair and Nails

- Dead, living part is below surface
- Composed of Keratin
- Balance of hormones
- Similar nutritional requirements
- Susceptible to toxins
- Reflect general state of health
- Not priority for the body

Hair Conditions

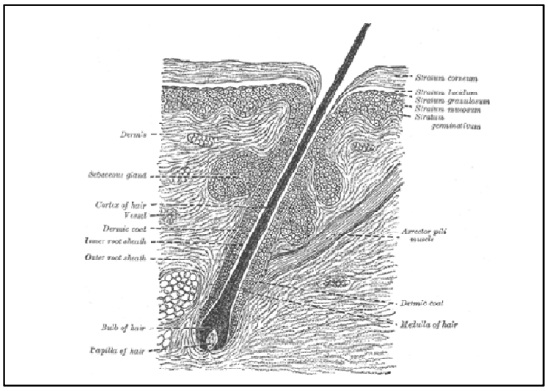
- Hair loss
- Thinning hair
- Dry, brittle hair
- Dandruff
- Greasy hair

Nail Conditions

- Dry, brittle nails
- Splitting, flaky nails
- Discoloured nails
- Ridged nails
- White spots
- Hangnails

Composition of Hair

- Hair Follicle – beneath the skin, located in the dermis. Maintains stem cells which regrow the hair when it falls out
- Shaft – hard, filamentous part that extends above the skin surface. A cross section of the hair shaft is divided into 3 zones.



Composition of Hair

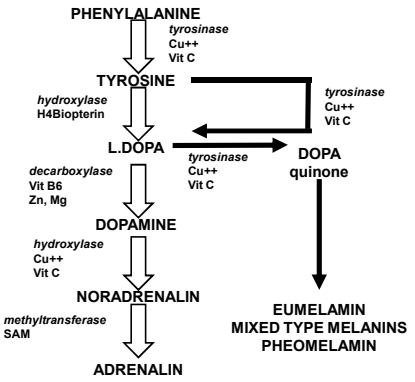
- **Cuticle – several layers of thin, overlapping cells**
- **Cortex – contains the keratin bundles**
- **Medulla – a disorganised and open area at the fibre's centre**

The Cortex

- **Primary source of mechanical strength and water uptake**
- **Contains melanin, which determines the colour of the fibres, depending on the number, distribution and type of melanin granules**

The Cortex

- Eumelanin - determines the darkness of the hair colour
- Pheomelanin –colours the hair red
- Blond hair is a low concentration of brown melanin
- High amounts of black eumelanin result in black hair
- Grey hair is a loss of melanin



The Cuticle

- Outer covering
- Covered with a singular molecular layer of lipid that makes the hair repel water
- Glands at the opening of the hair produce a fatty secretion to lubricate the hair and prevent it from drying out

Hair Growth – Anagen phase

- Active growth phase of hair follicles
- Root of hair is dividing rapidly, adding to the hair shaft
- Hair grows about 1 cm in 28 days
- Scalp hair – 2 to 7 years in anagen
- Unknown signal – catagen phase

Hair Growth – Catagen phase

- Short transition stage
- Signals the end of the active growth of the hair
- Lasts for 2 -3 weeks while the hair converts to a club hair
- When the part of the hair follicle in contact with the lower portion of the hair gets attached to shaft

Hair Growth – Catagen phase

- This process cuts the hair off from its blood supply and from the cells that produce new hair
- When a club hair is completely formed, about 2 weeks, the hair follicle enters the telogen phase

Hair Growth – Telogen phase

- Resting phase of the hair follicle
- Under extreme stress up to 70% of the hair can enter the telogen phase – telogen effluvium
- The club hair is the final product of telogen phase
- 50 to 100 club hairs are shed daily

Hair Growth Cycle times

- Scalp hair;
  - anagen 2 – 6 years
  - catagen 2 -3 weeks
  - telogen around 3 months
- Eyebrows
  - anagen 4 -7 months
  - catagen 3 – 4 weeks
  - telogen about 9 months

Hair Growth

- Human hair not coordinated
- At any one time different hair follicles are at different stages of growth cycle
- Normal to have ongoing continuous hair loss balanced by new hair growth

Hair Growth

- Common cause of hair loss is "telogen effluvium"
- Triggered by severe illness or stress
- Hair follicles go into their resting phase and hair growth ceases

Cause of Hair Problems

- Hormonal changes
- Toxicity
- Nutritional deficiency

Hormonal changes

- Dihydrotestosterone is responsible for hair loss
- If testosterone combines with 5-alpha reductase to form DHT, this leads to male pattern baldness
- DHT affects the hair follicles by attaching itself to special cells which affect the growth cycle

Hormonal changes

- **DHT reduces hair growth during the anagen stage whilst increasing the length of time during the telogen, (resting) stage**
- **Hair is shed as normal but new hair growth is restricted**

Hormonal changes

- **Oestrogen and Progesterone**
- **During pregnancy, oestrogen levels rise for the birth leads to a good head of hair**
- **After birth, fall in hormone levels which impacts the hair growth cycle. Hair is lost but not replaced by new growth.**

Hormonal changes

- **Oestrogen and Progesterone**
- **During menopause levels of oestrogen and progesterone decrease affecting the normal functioning of the hair follicles and disrupts the normal hair growth cycle.**

Hormonal changes

- **Thyroid**
- **Prolonged hypo and hyper thyroidism can cause loss of hair**
- **Loss is diffuse and involves the entire scalp as opposed to discrete areas, hair appears uniformly sparse**
- **Regrowth is usual with treatment**

Hormonal changes

- **Thyroid**
- **Over or under active thyroid disturb hair growth to the extent that new hair growth is stopped whilst the follicles enter a prolonged resting stage**

Suggested nutrition for hormones

- **Saw Palmetto**
- **Iodine – balance oestrogens and thyroid hormones**
- **Iodine 5ml**
- **Iodides – magnesium & potassium**
- **Sea vegetable tincture / capsules**
- **Bladderwrack capsules**

Suggested nutrition for hormones

- Selenium as Sodium selenate
- Manganese
- Smart Zinc
- Zinc picolinate + celery seed
- Zinc citrate + celery seed
- Zinc chloride
- Zinc sulphate
- Liquid zinc

Suggested nutrition for hormones

- Black Walnut tincture
- Balances male and female hormones
- Balances thyroid hormones
- Fights parasites
- Detoxifies metals and chemicals

Suggested nutrition for hormones

- Vitamins and coenzymes
- Niacin (NADH or NADPH) first path of hydroxylation so breaks down hormone derivatives
- Niacin also minimises cholesterol, if a build up of cholesterol in scalp, increases 5 alpha reductase, leads to hair loss

Toxicity in hair problems

Toxicity in hair problems

- **Poisons hair follicle, reduced function of growth and nourishment to the hair**
- **Prevents nutrients reaching hair follicle**
- **Reduces hormones required for hair growth, imbalance of hormones**

Toxins

Toxic metals – **Black walnut**
Coriander herb
Coriander spice
Lemon balm
Lipoic acid
Yarrow
Glutathione

Vitamin C for nickel

Toxins

Chemicals -

- Black walnut
- Coriander spice
- NAC
- Lemon balm
- Rosemary
- Yarrow
- Other spice

Toxins

Radiation -

- Chlorella
- Coriander spice
- Smart Vitamin C (Rutin)
- Turmeric
- Yarrow

Nutrition for healthy hair

- Trichological society
- Genetics and health are factors in hair wellbeing
- Proper nutrition – living part of the hair is in the scalp and derives its nutrients from blood
- For each new cycle, follicle is built anew from raw materials

Nutrition for healthy hair

- **B group vitamins**
- **Biotin – helps prevent dermatitis and scaling of the scalp**
- **Biotin activates enzymes to construct fatty acids in body**
- **Deficiency can cause brittle hair and hair loss**

Nutrition for healthy hair

- **Harvard University study suggests that biotin is one of the most important nutrients for preserving hair strength, texture and function**

Nutrition for healthy hair

- **EFAs, B12 and iron prevent a dry scalp**
- **Vitamins A and C help with production of sebum to provide a natural hair conditioner**
- **Alpha lipoic acid to condition**
- **Zinc prevents hair shedding**

Nutrition for healthy hair

- **B5 (pantothenic acid) gives hair flexibility, strength and shine, helps prevent hair loss**
- **B6 prevents dandruff, helps with hormones**
- **B12 helps prevent the loss of hair**
- **B1,B2, B3 and B5 nourish hair follicle cells**

Nutrition for healthy hair

- **Folic acid contributes to hair follicle cell division and growth**
- **Folic acid**
- **Folic acid + zinc**
- **Folinic acid**
- **CH2H4folate - methylene THF**
- **5-MTHF – methyl THF**
- **H4biopterin**

Nutrition for healthy hair

- **Vitamin C helps to produce and maintain healthy collagen, the connective tissue type in hair follicles**
- **Strong antioxidant and protects the cells in the hair follicles and the nearby blood vessels**

Vitamin C Complex
is
Ascorbic acid
***Tyrosinase* enzyme. Rich in**
Shiitaki and Reishi mushrooms,
beetroot and potato juice.
Vitamin P – from rutin
(buckwheat), citrus bioflavonoids.
Fagio – John Hopkins University 1932

Epigenetics Vitamin C Complex
Ascorbic acid 250mg
Organ Reishi mushroom 50mg
Organic Shiitaki mushroom 50mg
Organic Beetroot 50mg
Hesperidin 25mg
Rutin 25mg
α-Lipoic acid 25mg

Nutrition for healthy hair

Nutrition for healthy hair

- **Vitamin E helps to maintain the integrity of cell membranes of the hair follicles**
- **Provides physical stability to cell membranes and acts as an antioxidant while promoting healthy hair and skin**

Nutrition for healthy hair

- **Wheatgerm Oil**

Nutrition for healthy hair

- **Vitamin A**
- **Helps maintain normal growth and bone development**
- **Promotes healthy hair, nails,skin**
- **Fat soluble vitamin – walnut oil**

Nutrition for healthy hair

- **Minerals**
- **Zinc is essential for DNA and RNA production which leads to normal follicle-cell division**
- **Stabilises cell membrane structure**
- **Assists in the breakdown and removal of superoxide radicals**
- **Magnesium, iron, sulphur, silica**

Nutrition for healthy hair

- **Essential fatty acids**
- **Important role in cell structure, barrier function & lipid synthesis**
- **Reduces dry, scaly scalp**
- **Support follicular health**
- **Deficiency leads to hair loss or thinning**

Nutrition for the hair

- **Hair is composed of protein, notably keratin**
- **Keratins have large amounts of the sulphur containing amino acid cysteine**
- **This is required for the disulphide bridges which confer strength and rigidity**

Nutrition for the hair

- **Human hair is approx. 14% cysteine, accounts for the pungent smell of burning hair due to sulphur compounds**
- **The more flexible and elastic keratins of hair have fewer disulphide bridges than fingernails**

Nutrition for the hair

- **Hair is composed of protein, notably keratin and cannot thrive without the proper nutrition**
- **Diet high in good quality proteins, meat, fish, beans, eggs**
- **Additional keratin from hair products**

Nutrition for healthy hair

- **Amino Acids**
- **Methionine, sulphur-containing, supports hair strength by providing sulphur to hair cells. Sulphur is required for healthy connective tissue formation**
- **Cysteine supports hair strength by provision of sulphur**

Nutrition for healthy hair

- Cysteine is high in hair and nails
- Lysine – male pattern baldness is less common in Asians than in Americans, in part due to Asian diet rich in Lysine, enzyme inhibiting amino acid in vegetables and herbs affecting 5 alpha reductase in some way

Epigenetics Hair Care Products

- No toxins – hormone disruptors, disrupts the very hormones we need to make the hair grow and be in good condition
- Keratin – use plant source not animal keratin, not slaughterhouse by-products eg. Pigs hair

Epigenetics Hair Care Products

- Plant source keratin
- Enhances the moisture binding ability of the hair
- Augments the amino acids that are naturally present in the hair
- Gives strength, shine and bounce to the hair

Epigenetics Hair Care Products

- **EFA Oils**
- **Wonder oil – balanced 3,6 & 9**
- **Sesame oil – half fatty to half dry**
- **Olive oil – squalene helps to regulate sebum and very closely resembles human sebum**
- **Hazelnut oil – contains squalene, dry oil**

Epigenetics Hair Care Products

- **D-Panthenol**
- **Coats, lubricates and protects the hair**

Nails

Structure of Nails

- Made of tough, protective protein, keratin
- Consists of the nail plate, nail matrix and the nail bed

Nail Anatomy

Structure of Nails

- The nail plate is the hard part of the nail
- Made of translucent keratin protein
- Several layers of dead, compacted cells make the nail strong but flexible

Structure of Nails

- The cuticle is the semi-circular layer of non-living, mostly invisible dead cells
- Cover the back of the visible nail plate

Structure of Nails

- **Matrix is the tissue which the nail protects**
- **Beneath the nail and contains nerves, lymph and blood vessels**
- **Produces cells that become the nail plate**

Structure of Nails

- **As new nail plate cells are made they push older ones forward**
- **The older cells become pressed, flat and translucent so the capillaries in the nail bed become visible and give the pink nail colour**
- **Small moon is the visible part**

Structure of Nails

- **The nail bed is the skin beneath the nail plate**
- **2 types of tissue, the dermis and the epidermis. The dermis is attached to the epidermis by grooves – see when the nail plate gets thinner as in old age**

Nutrition for Nails

- **Vitamin A – cell and tissue differentiation, deficiency leads to fragile nails and ridges**
- **Vitamin D &calcium – membrane structure**
- **Vitamin B12 – deficiency can lead to excessive dryness, darkened nails, ridges**

Nutrition for Nails

- **Protein is the building material for new nails**
- **Reduced haemoglobin in the blood results in whiter nail beds**
- **Deficiencies in folic acid and vitamin C produce hangnails or split nails**

Nutrition for Nails

- **EFAs important. Splitting and flaking due to lack of linoleic acid**
- **Iron deficiency lead to a pale colour with a thin, brittle ridged texture**
- **Zinc deficiency – pitted nails and white spots on nails**

Hormonal Implications for Nails

- Deficiency in thyroid hormones
- Dry, brittle nails
- Cracked and split easily

Hormonal Implications for Nails

- A study published by Fay Marnock suggested measuring hormone levels using fingernails
- As the nail's matrix builds up with keratin, hormones diffuse into the nail from capillaries in the blood
- Indication over a prolonged period

Hormonal Implications for Nails

- A symptom of osteoporosis can be brittle fingernails
- Clinical trial – comparing nail structure with bone integrity over the course of chemotherapy
- Also comparing the nails of people who have had a bone fracture

Hormonal Implications for Nails

- **"Fingernails in evaluating bone health in Postmenopausal women with Breast cancer undergoing Hormone therapy", Clinical Trial IBCSG-1-98**

Hormonal Implications for Nails

- **Adequate levels of testosterone, needed for protein synthesis, keratin**
- **Levels of HCL for absorption of amino acids and nutrients**
- **Vertical lines can be low growth hormone – Dr Thierry Hertoghe**

Hormonal Implications for Nails

- **Dry, brittle nails can be a hallmark of menopause. Healthy nails must be hydrated.**
- **Estrogens responsible for keeping water in body tissues**
- **Dull, yellow fingernails can be due to dehydration often in the elderly**

Hormonal Implications for Nails

- Dry, brittle nails can be a sign of hypothyroidism
- Low thyroid function, circulation to extremities is impaired
- Nutrients in blood do not get to fingernail
- Nail be can also become very pale

Hormonal Implications for Nails

- Parathyroid gland regulates Calcium and Vitamin D
- If the glands are not producing enough parathyroid hormone, brittle nails can result
- Check levels of Vitamin D

Summary Nutrition for Nails

- Vitamin Bs, B complex
- Vitamin C
- Vitamin A
- Vitamin E
- Calcium
- Zinc
- Iodine
- Iron

Summary of conditions & Nutrition

- Dry, breaking, peeling – vitamin C, vitamin D, biotin
- Weak nails – vitamin Bs, silica, zinc, iron, iodine or selenium
- Fragile nails – vitamin Bs, protein
- Ridged nails – vitamin Bs, iron
- Fungal nails – zinc, probiotics

Fat Soluble Vitamins in Nail Health

- Vitamin A – body cannot absorb or process proteins effectively
- Vitamin D – calcium not assimilated properly
- Vitamin D – now believed to be involved in functioning of keratinocytes
- EFA – cell membranes, O2 to cells

Epigenetics Hand and Nail Cream

- Rich, hydrating and protective
- Cream base:
- Coconut butter
- Cocoa butter
- Shea butter
- Wonder oil

Epigenetics Hand and Nail Cream

- Active Ingredients
- Urea
  - Body's natural moisturiser, maintains fluid homeostasis
  - Synthesized from ammonia and carbon dioxide

Epigenetics Hand and Nail Cream

- Folic Acid and Zinc
  - used in the regeneration of cells in the skin, nail and cuticle
- Sodium phosphate
  - Brings more energy to the cells
  - Supplies the phosphate in the mitochondria to synthesize ATP
- 100ml pot

Hair and Nails

- No specific test for hair or nails
- Use a marker and test the nutrients, toxins to give the individual requirements
- Test hormone levels
- Anything can fix anything
- Test vial for keratin