Which is the most important vitamin?

Vitamin – VITAL AMINE – essential for health

"an organic compound, not made at all or in sufficient amounts by the body"

Which is the most important ?

A (or beta carotene)

B 1,2,3,4,6,8,10,12

C

D

E

K

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B 1,2,3,4,6,8,10,12

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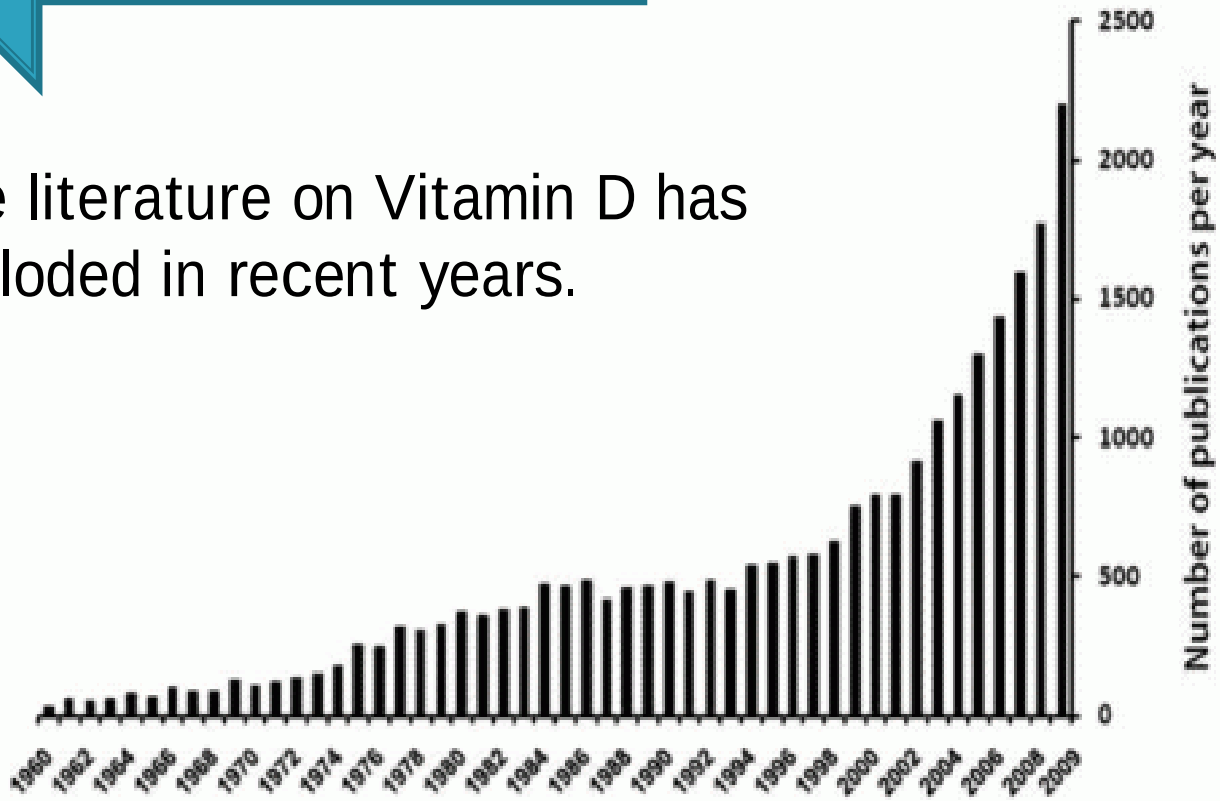
The literature on Vitamin D has exploded in recent years.



Vitamin D

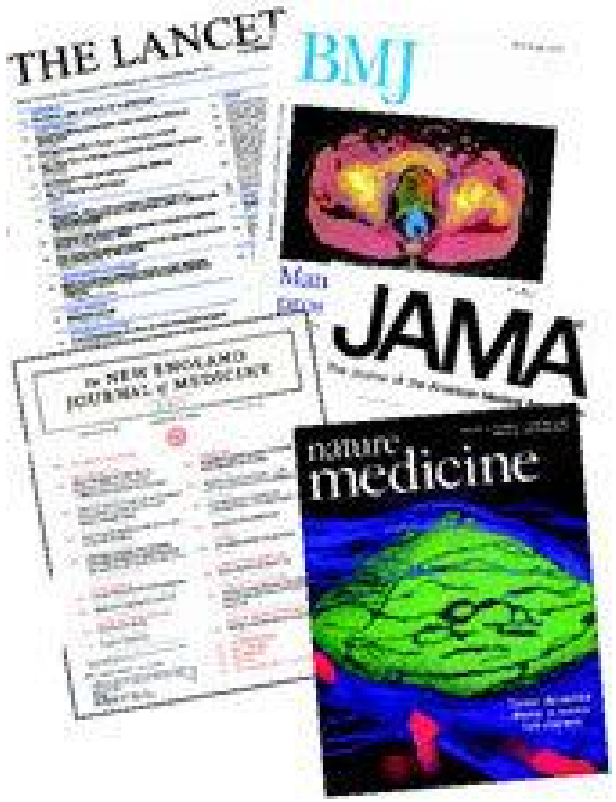
The sunshine vitamin

Vitamin D does numerous things.

•helping us absorb calcium - healthy bones, healthy teeth

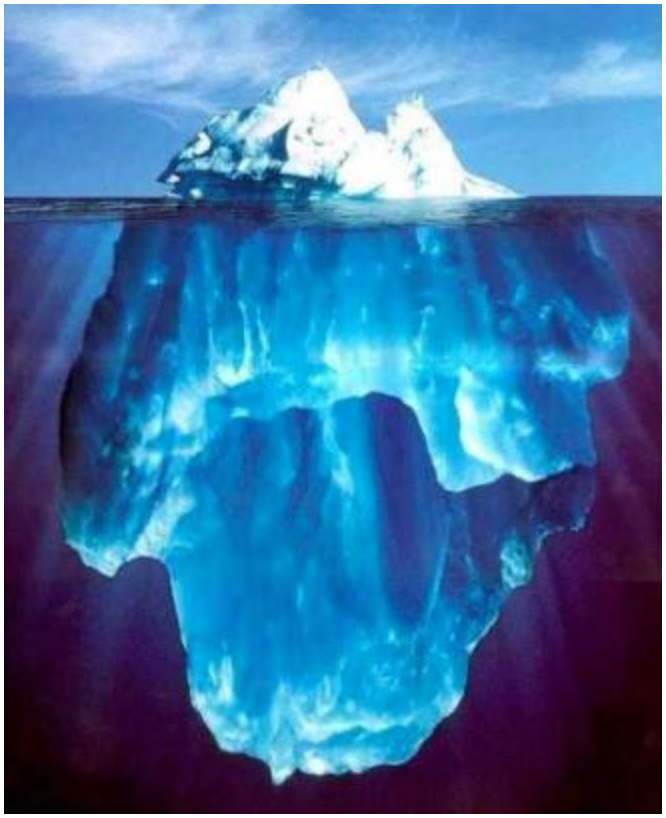
Vitamin D does numerous things.

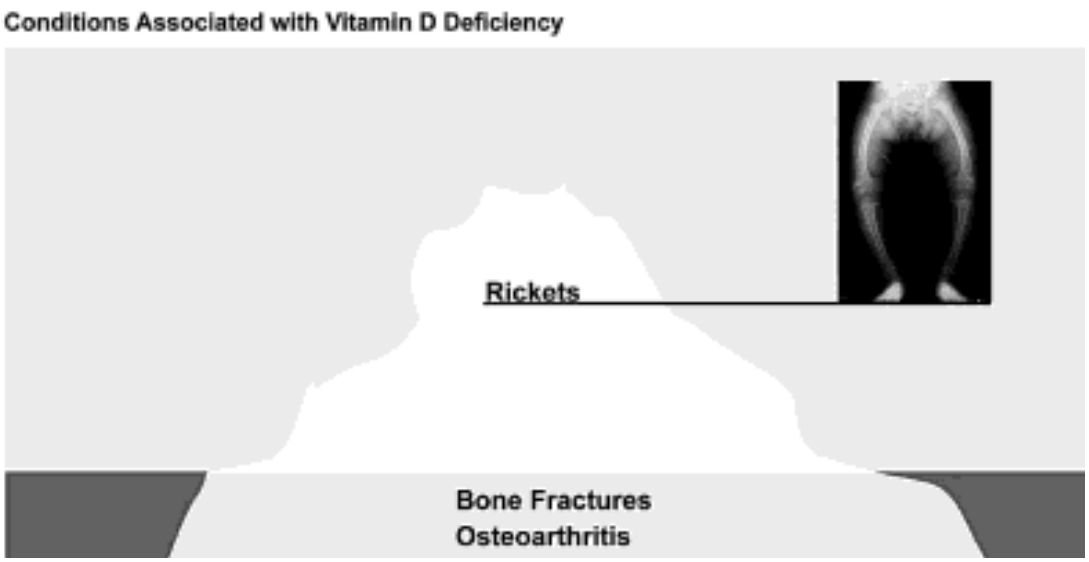
- helping us absorb calcium - healthy bones, healthy teeth
- Helps the immune systems
- Improves mental health & memory
- Controls a gene carried by people with multiple sclerosis.
- Pregnant women with good levels less likely to need a cesarean.
- Lower risk of certain cancers.
- Lower risk of diabetes.
- Lower risk of heart disease
- ……



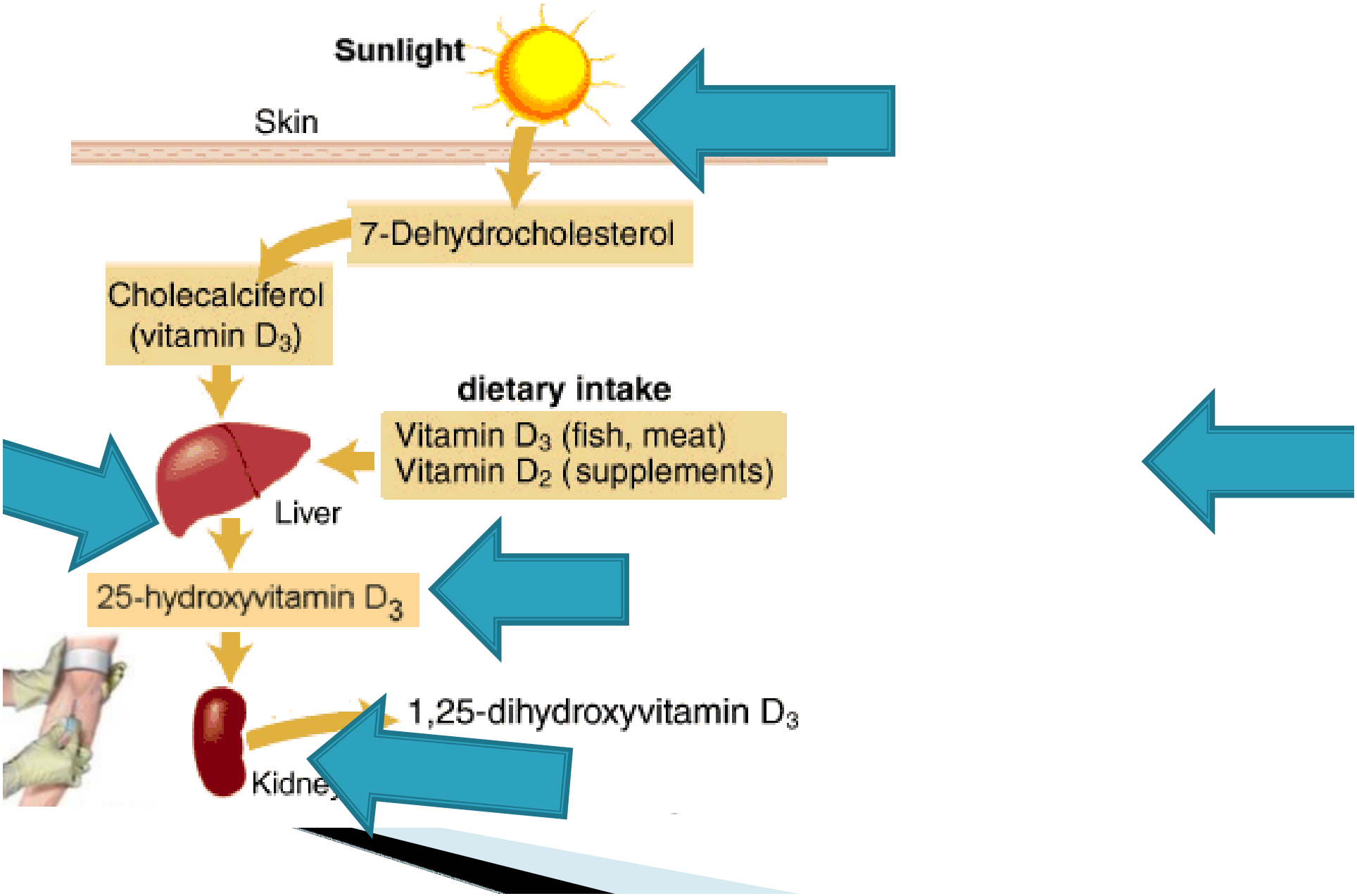
This is one vitamin we ALL need to understand and take from an early age!

What does vitamin D do?





Sun (UVB) on the skin turns cholesterol into vitamin D.

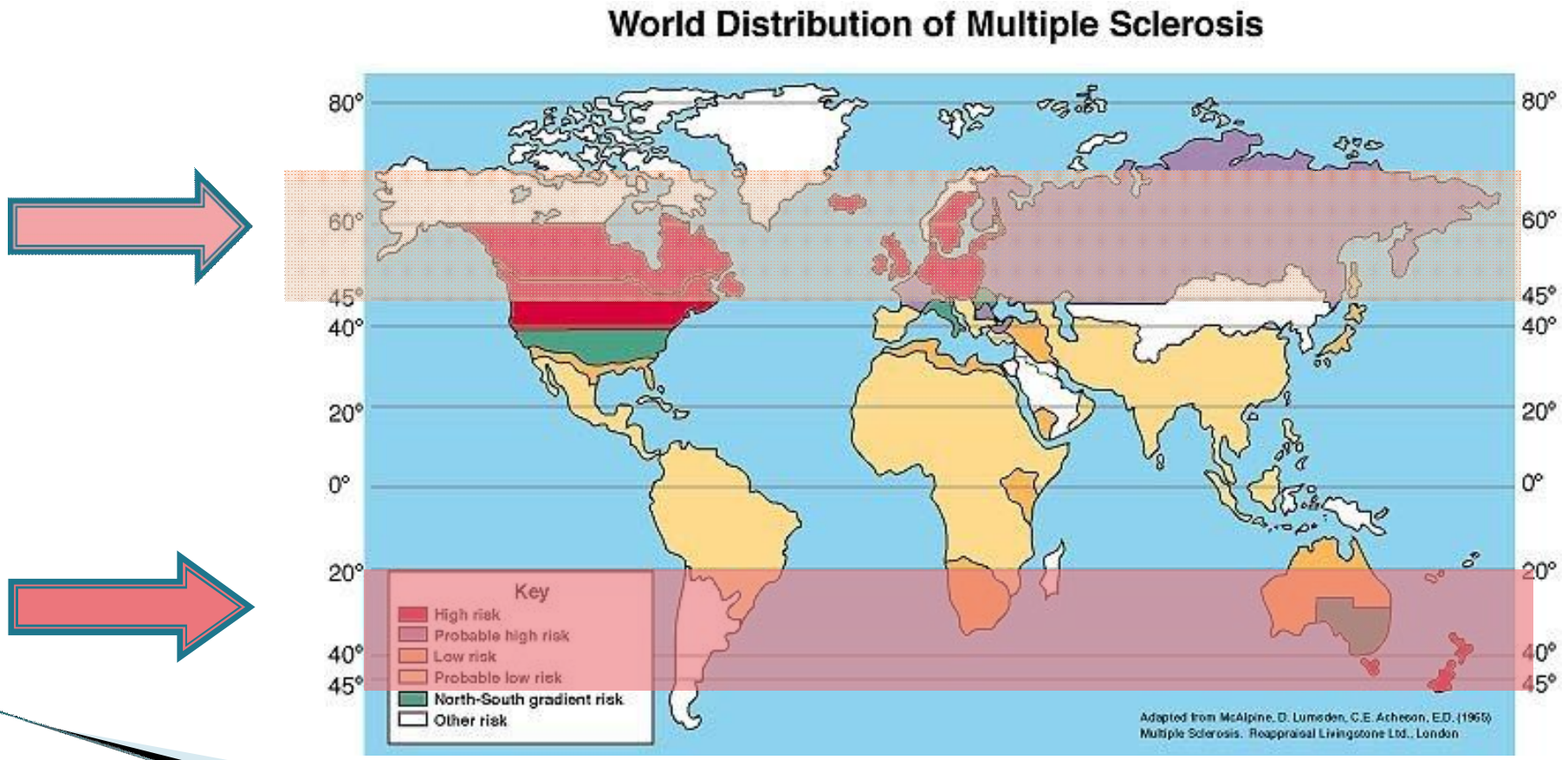


Recent publicity on melanoma - has reduced our sun exposure – so we are getting less vitamin D

Does sun exposure matter?

It seems to from looking at diseases round the world.

The further from the equator (and so less UVB all year round) the higher is the incidence of many diseases:



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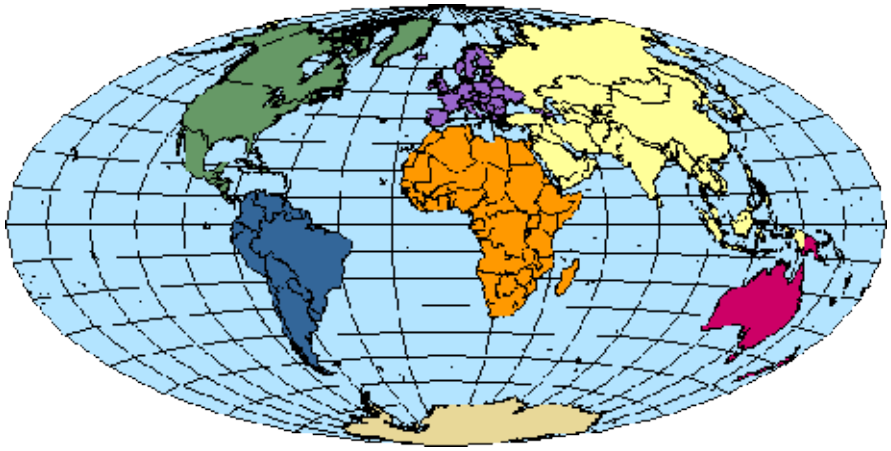

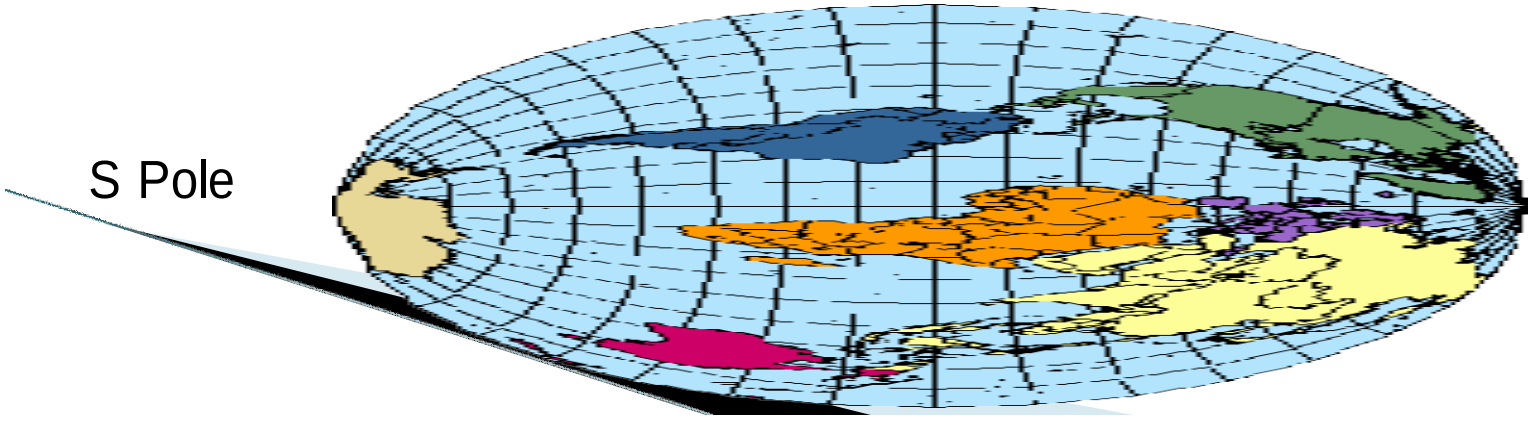

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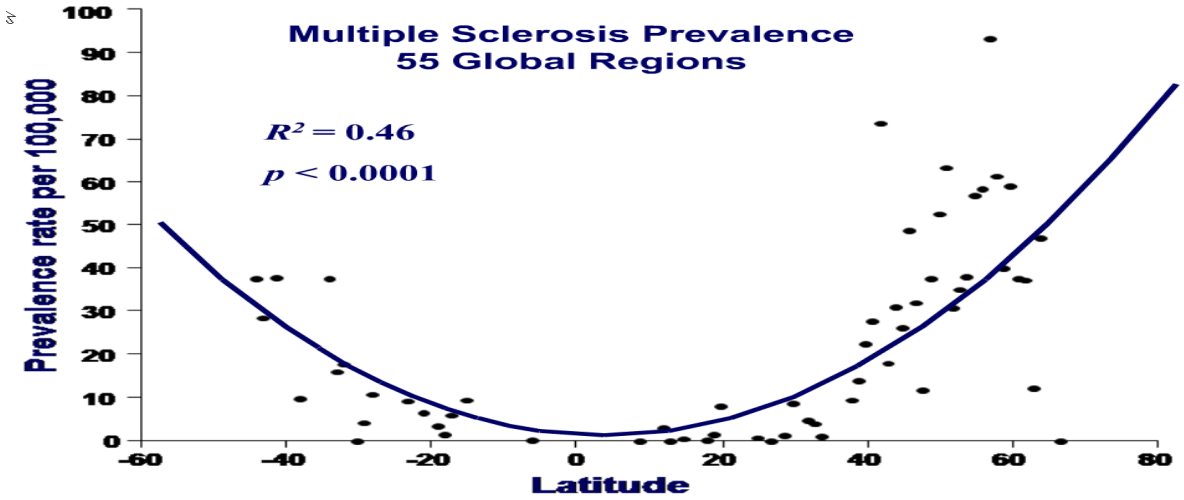

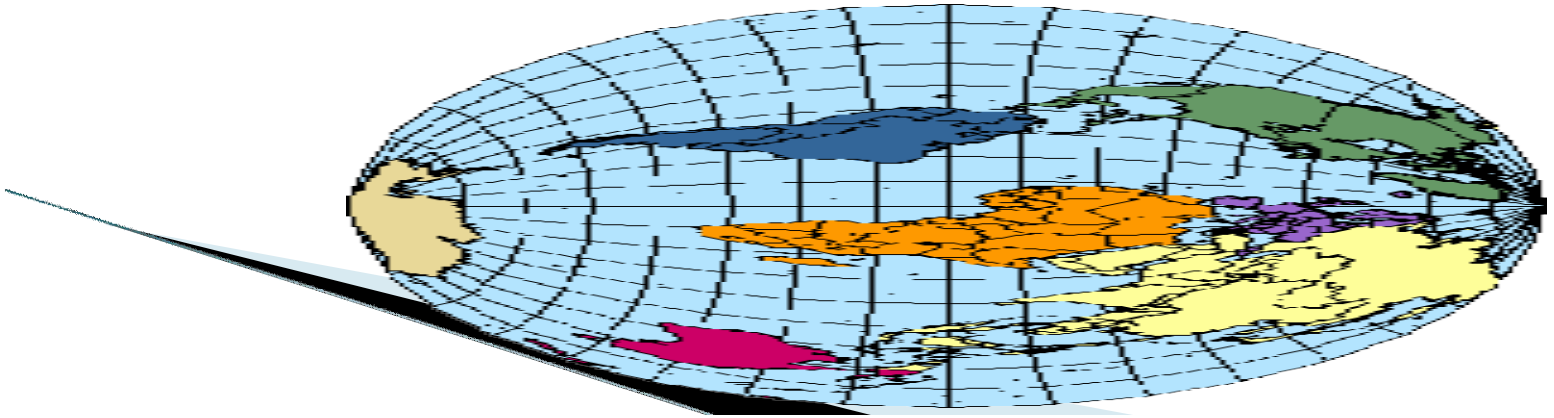

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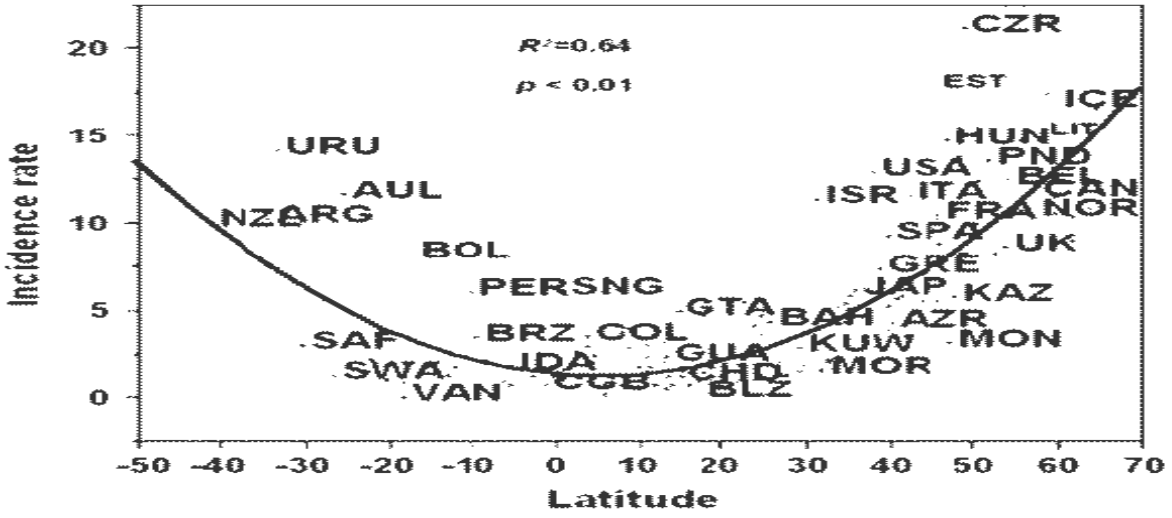
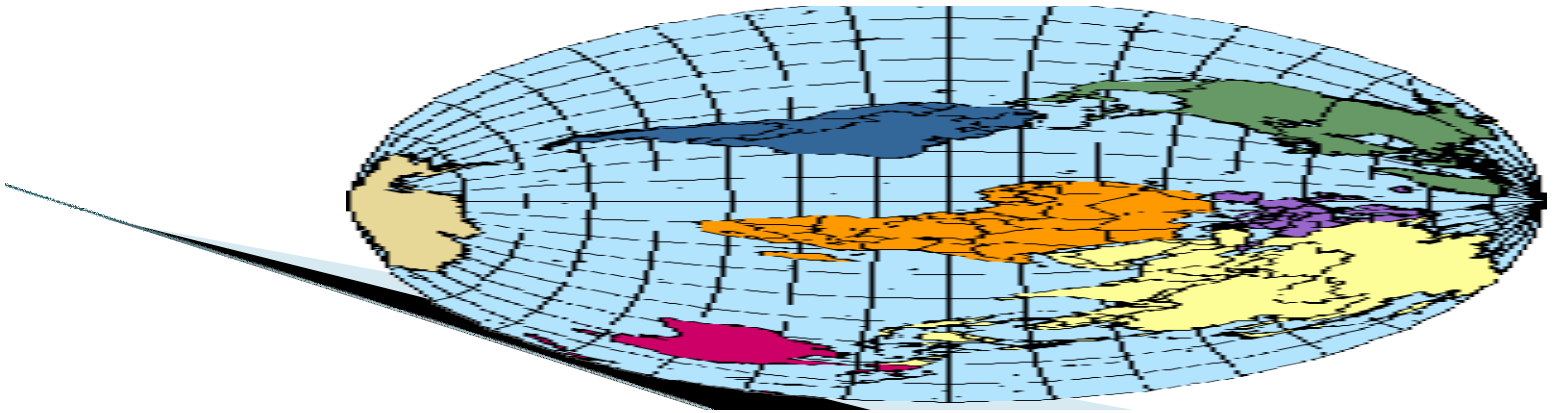
CANCER

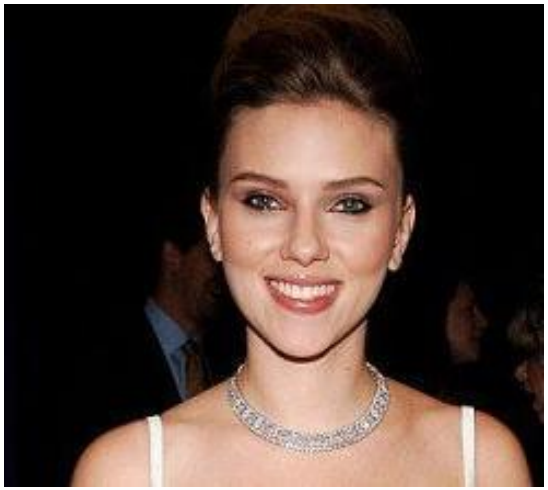




Breast cancer risk is less in people who go out in the sun

Stanford university studied of 1700 women with breast cancer and 2000 controls.

Measured pigment on forehead head



White women with high sun exposure had 47% less breast cancer compared to those with low exposure.

American Journal of Epidemiology Advance October 12, 2007

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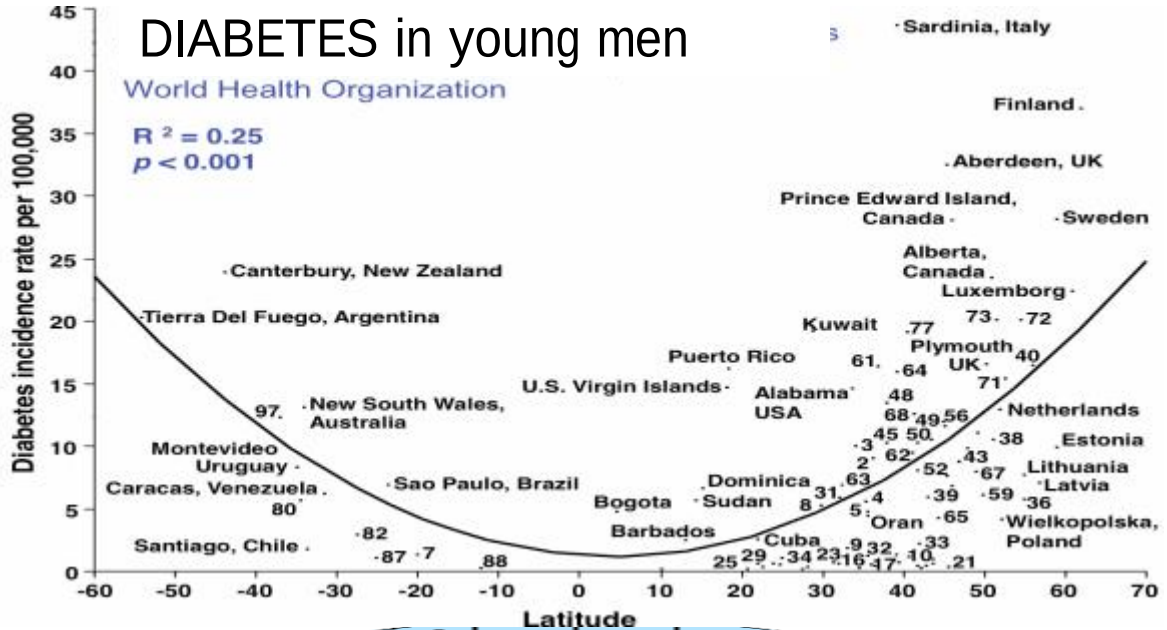

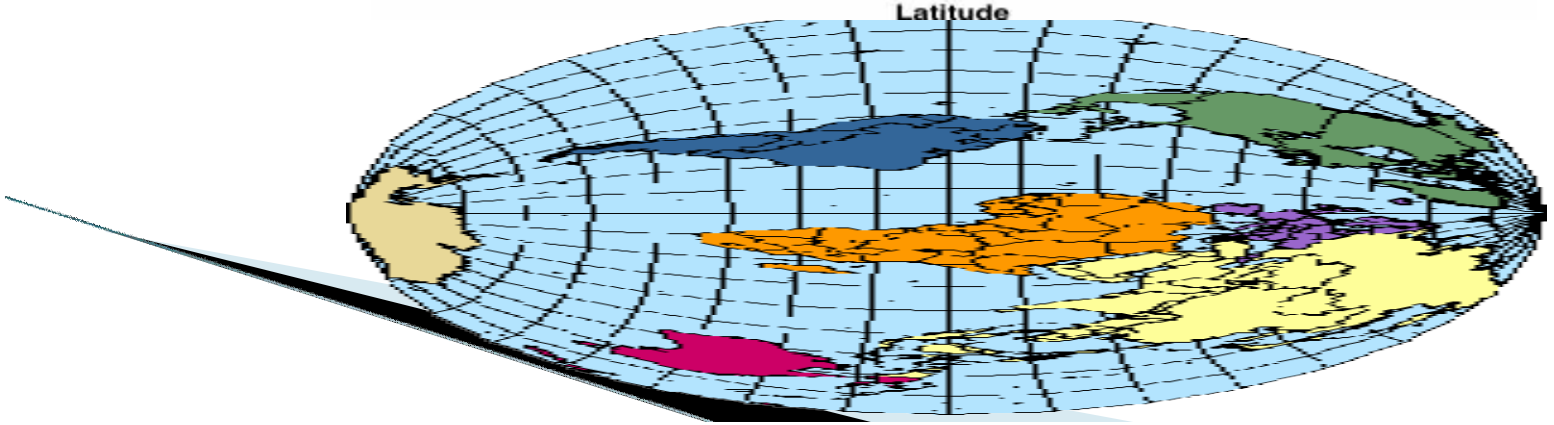

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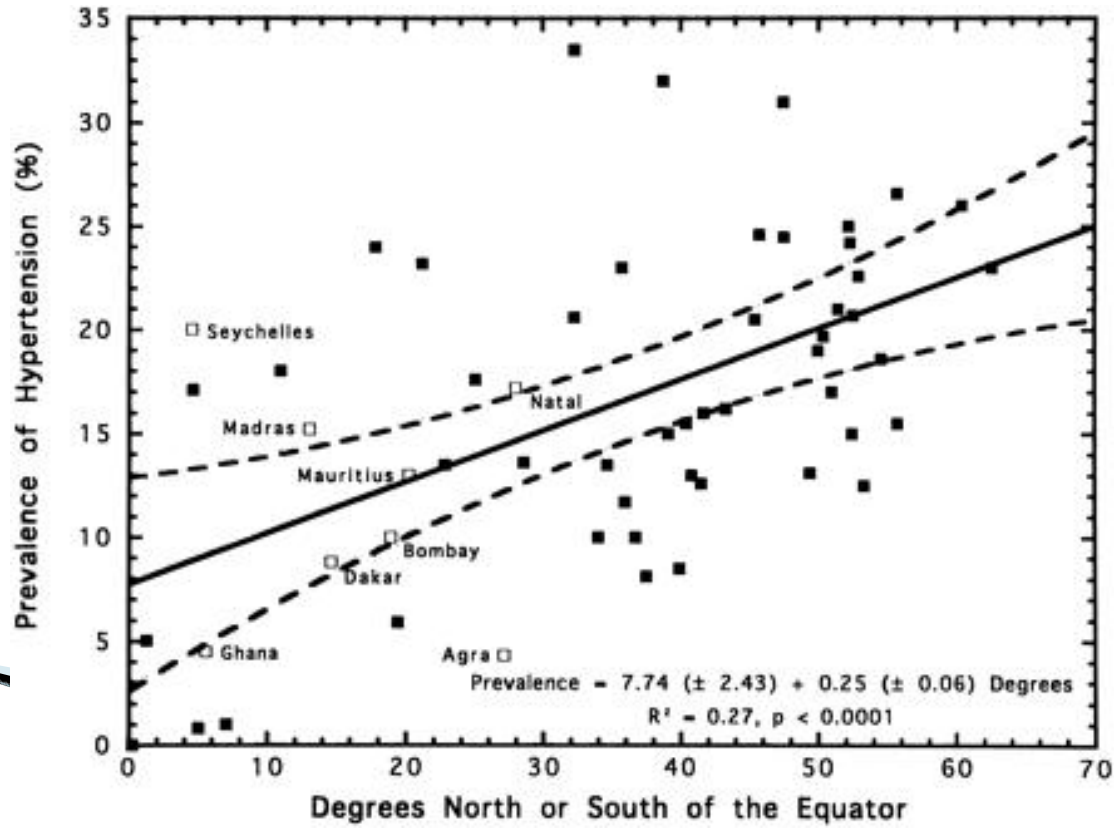
Equator

HIGH BLOOD PRESSURE



Low Vitamin D levels have been found as causing or affecting many diseases:

- Cancer
- Heart disease
- Diabetes
- Infections & immunity
- Mental function
- Crohn's disease
- Rheumatoid arthritis
- High BP
- Multiple sclerosis
- Asthma
- ……

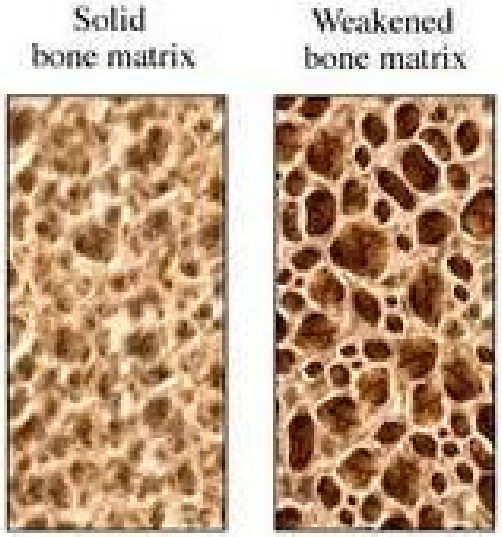
How can one vitamin have so many effects?

Do we all need more vitamin D?
How much?

BONE

Vitamin D increases calcium absorption in the gut and encourages new bone formation.

Deficiency → Rickets and osteoporosis



People with low vitamin D levels had more:

Leg artery disease – 80% more (NHANES2001-2004)
Heart attacks – 62% more - Framingham (Circulation Jan 2008)
High BP – 300% more - in a 15 year study of women in Michigan School of public health (AHA BP. Conference 2009)
Diabetes – 57% more (5000 Australian Institute of medicine 2011)
Cancer – 72% more colorectal cancer (NHANES 2010)*

And people taking Vitamin D supplements reduced

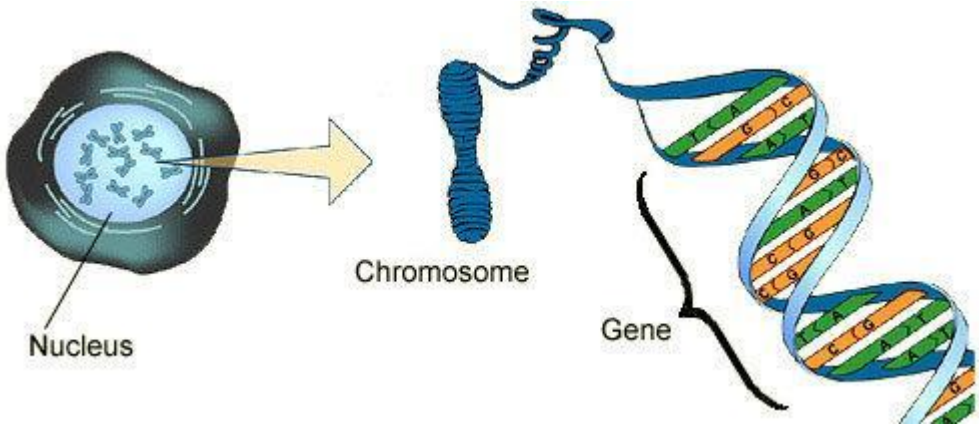
- Pancreatic cancer 45% in 120,000 people in 2006**
- All cancers reduced 77% in 1,200 women***

*C*ancer Epidemiology Biomarkers & Prevention* **15** (9): 1688–95. 2006
***The American Journal of Clinical Nutrition* **85** (6): 1586–91 2007
****American Journal of Clinical Nutrition* **91** (5): 1324–35. 2010

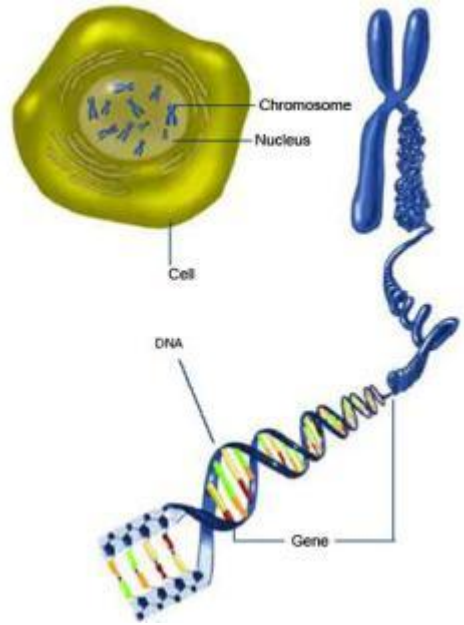
What does Vitamin D do to make such a difference in health?

Vitamin D ‘affects gene expression”
It turns genes on and off.

In the nucleus of all of our cells are chromosomes– one from mum and one from dad.
These are made of DNA – and segments of DNA are genes.



The genes are the blueprint of the cells



- Eye colour, height, skin colour, nose..
- Makes proteins in the cell to
  - build,
  - repair,
  - recover,
  - fight
  - function

These only action when needed

For many processes – vitamin D is essential for the switch to work.

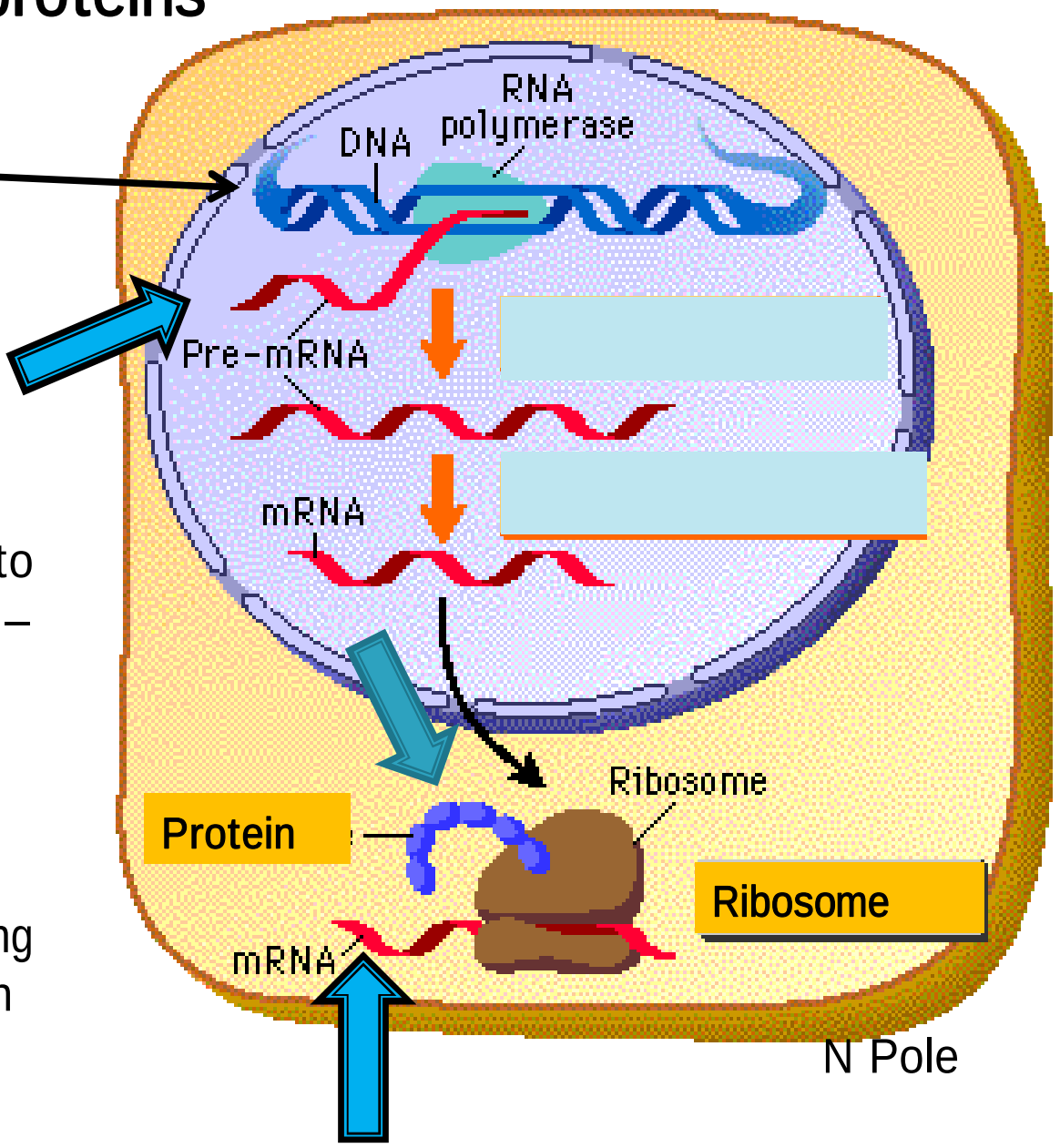
How the cells make proteins

The DNA is the blue print plan

Messenger RNA makes a copy of the DNA

Goes out of the nucleus to the ‘production’ factory – the ribosomes

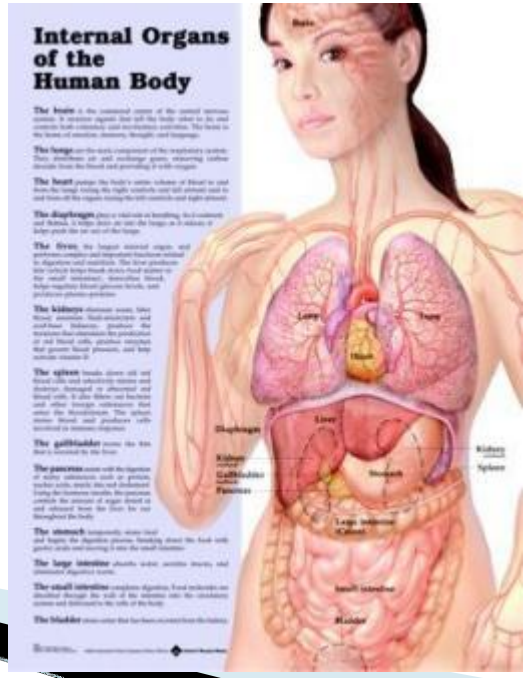
The MRNA runs thru the ribosome like a tape, giving instructions on the protein to make.

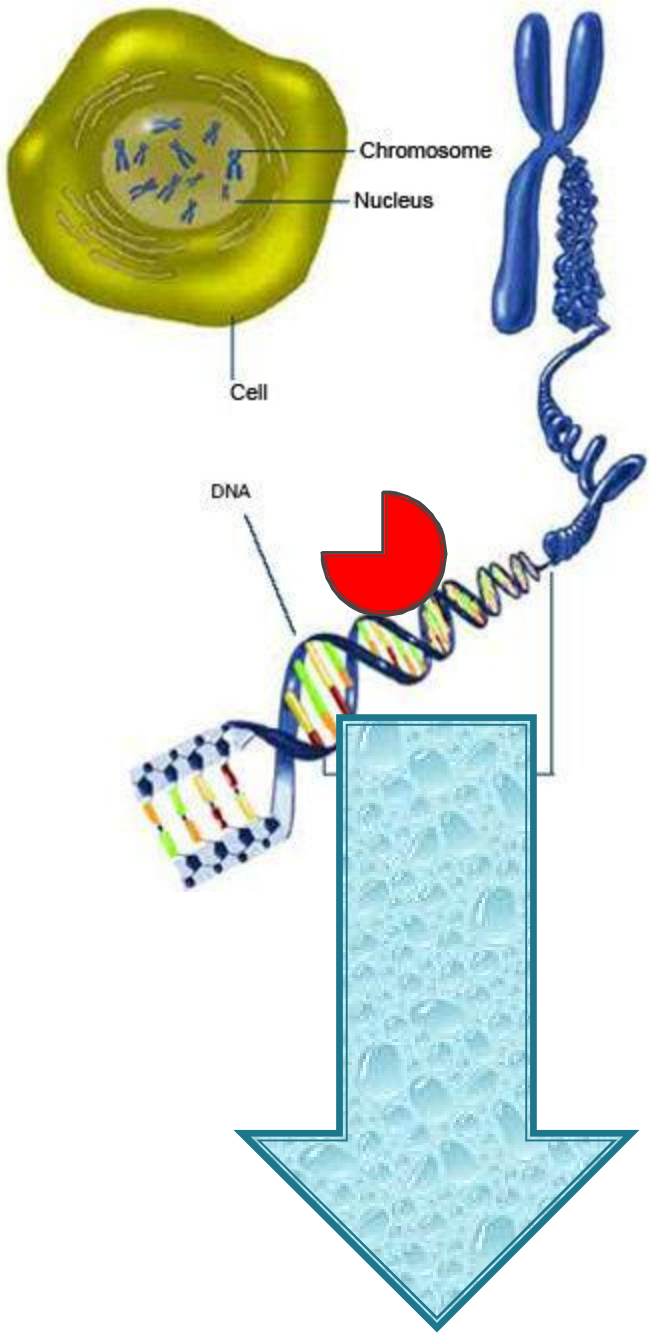


Genes don't want to be making proteins continuously – they need to be turned on and off – REGULATORS.

Vitamin D is a major regulator in the human.

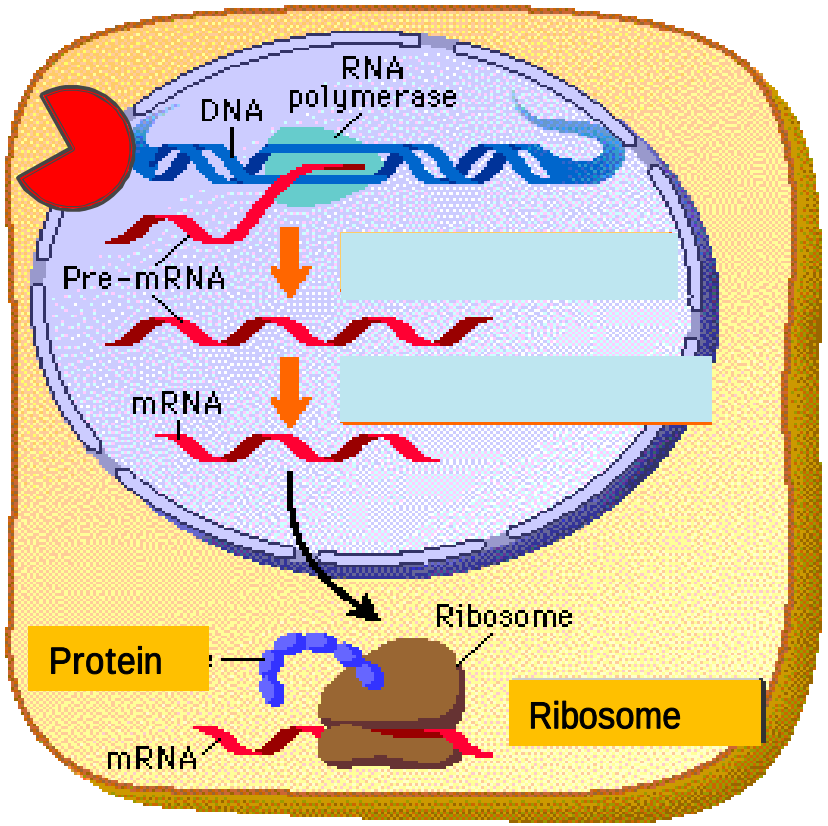
There are over 230 Vitamin D receptors in the nucleus of most tissues in our bodies.





The vitamin D receptors (VDR) up or down regulate the activity of the cell production.
VDRs have been found by genes associated with:

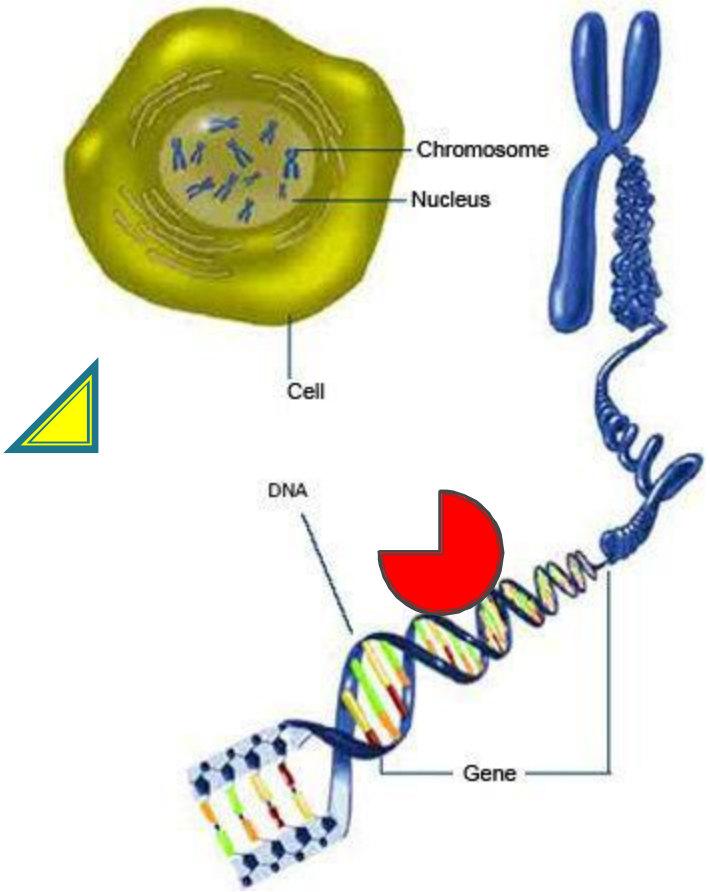
- Diabetes
- Crohn's disease
- Cancer
- Leukaemia
- Rheumatoid arthritis
- Multiple sclerosis
- And we have only just started looking……

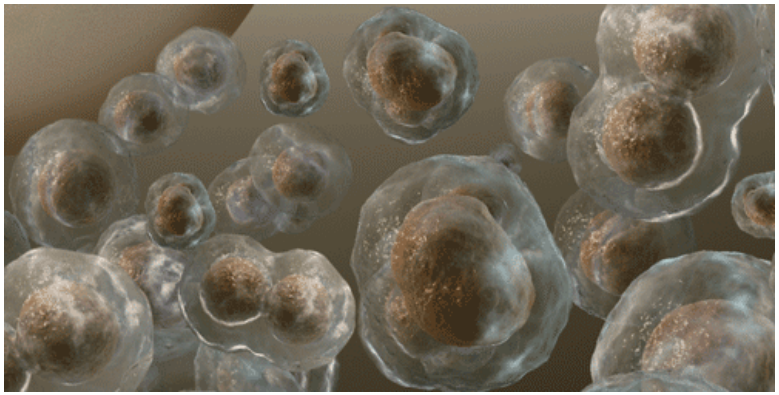


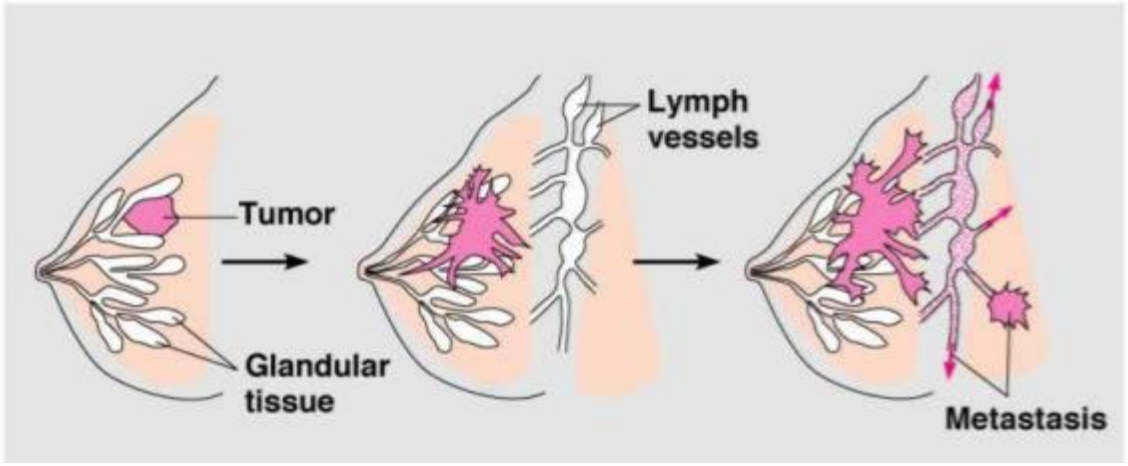
This explains why vitamin D may have a role in preventing cancer, influenza, autism, asthma, multiple sclerosis, and cardiovascular disease, not just curing rickets and osteomalacia

Vitamin D also tells cells when to divide, stop dividing and also when to die (apoptosis).

With low vitamin D levels, cells may
•Not die and become immortal
•Continue to divide out of control







Vitamin D affects cancer cells in a number of ways:

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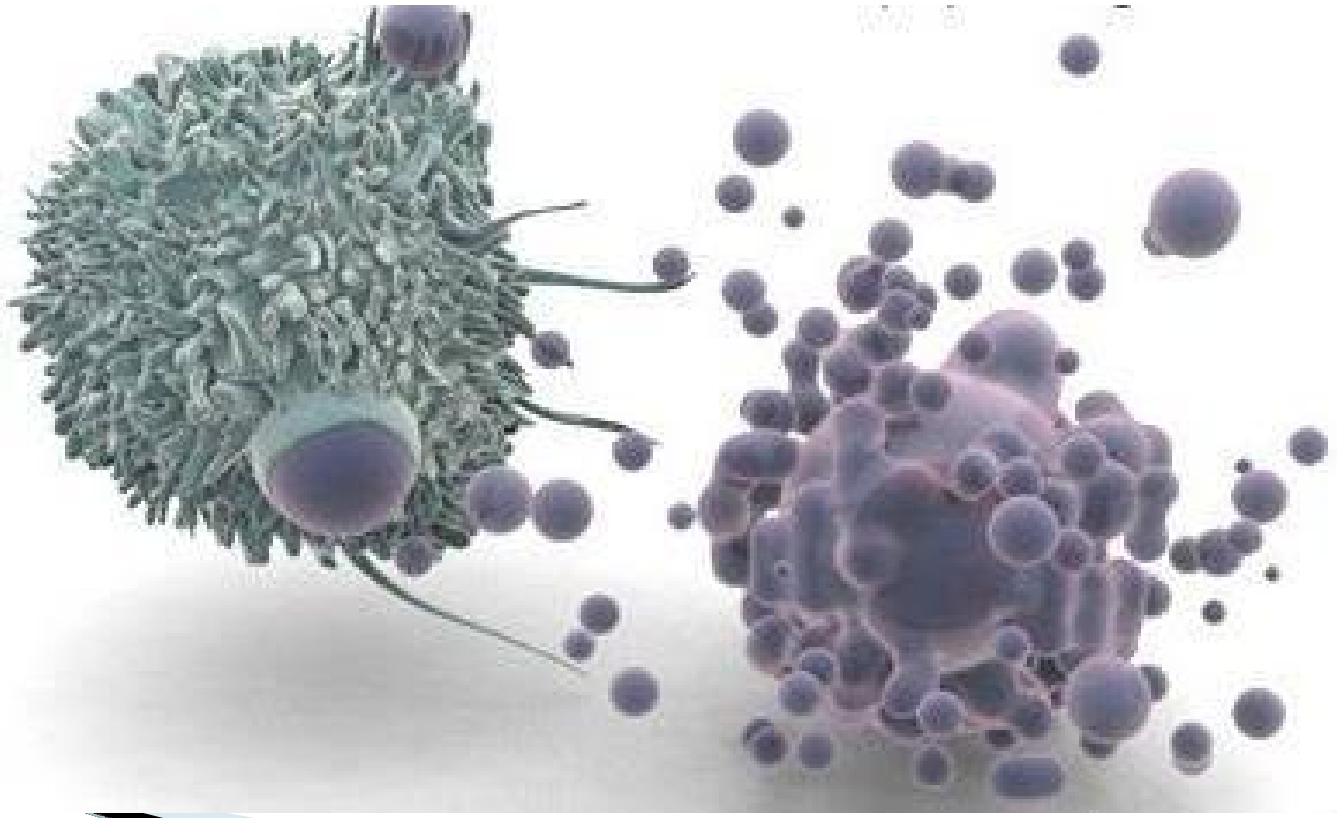
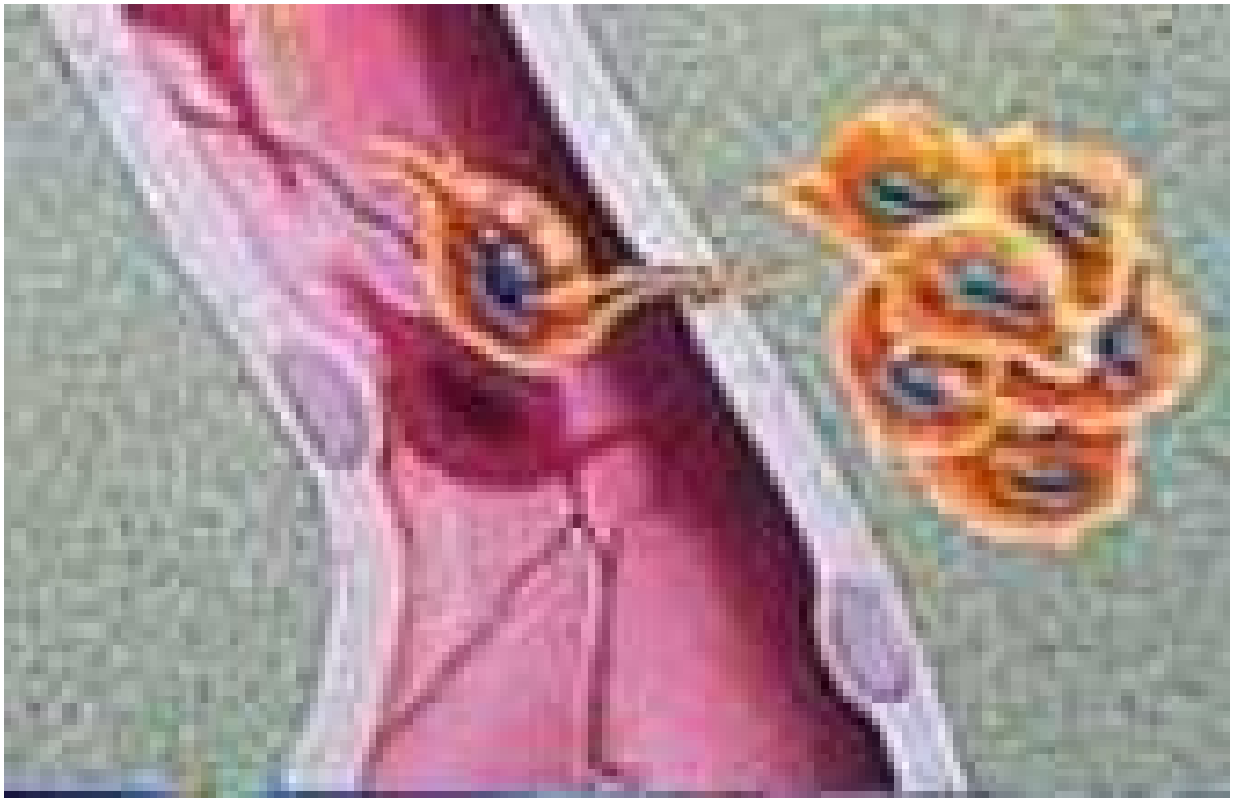
•Switches apoptosis back on – programmed cell death



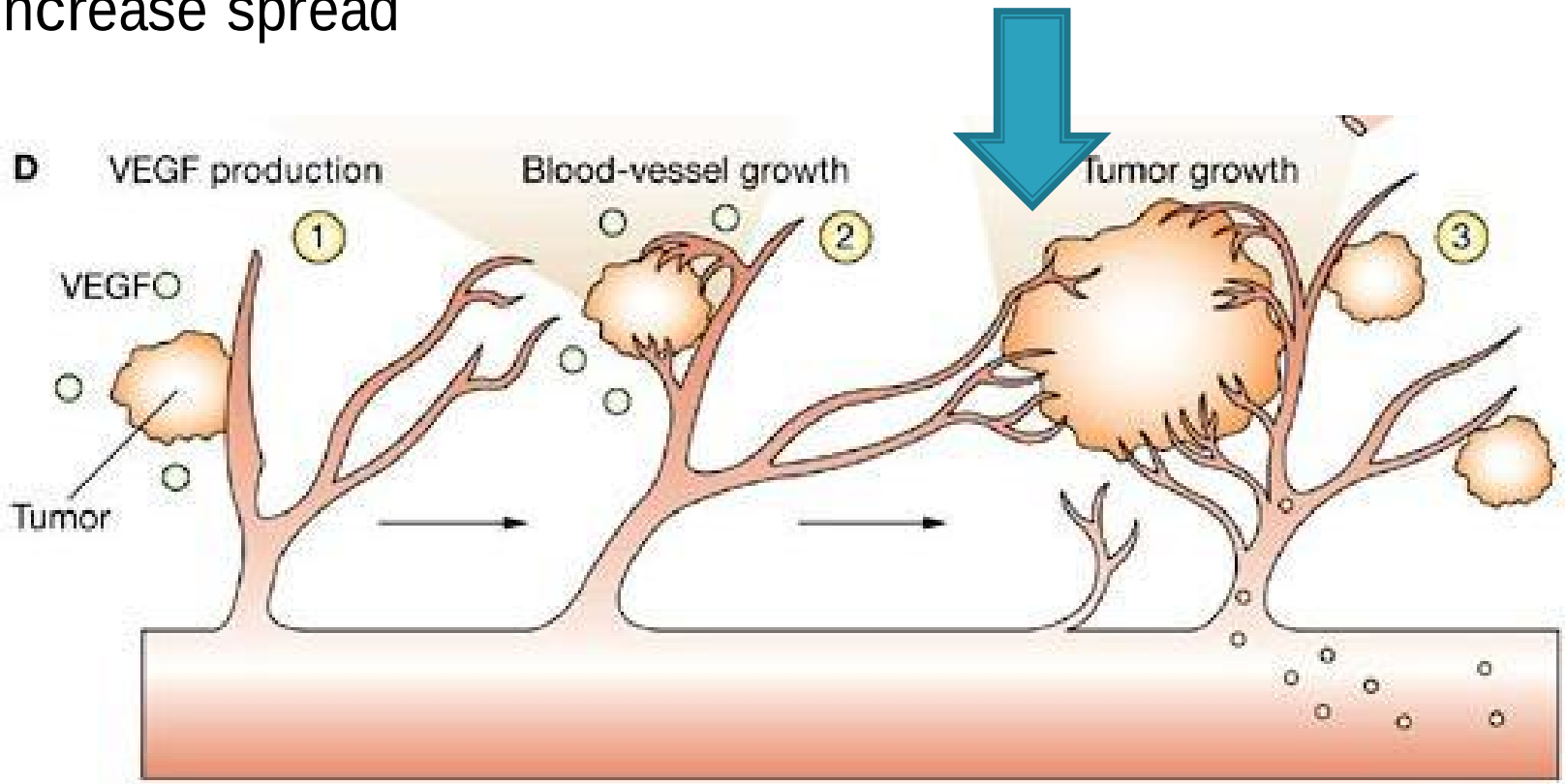
Vitamin D affects cancer cells in a number of ways:

- Switches apoptosis back on – programmed cell death
- Slows down multiplication and spread of cancer cells



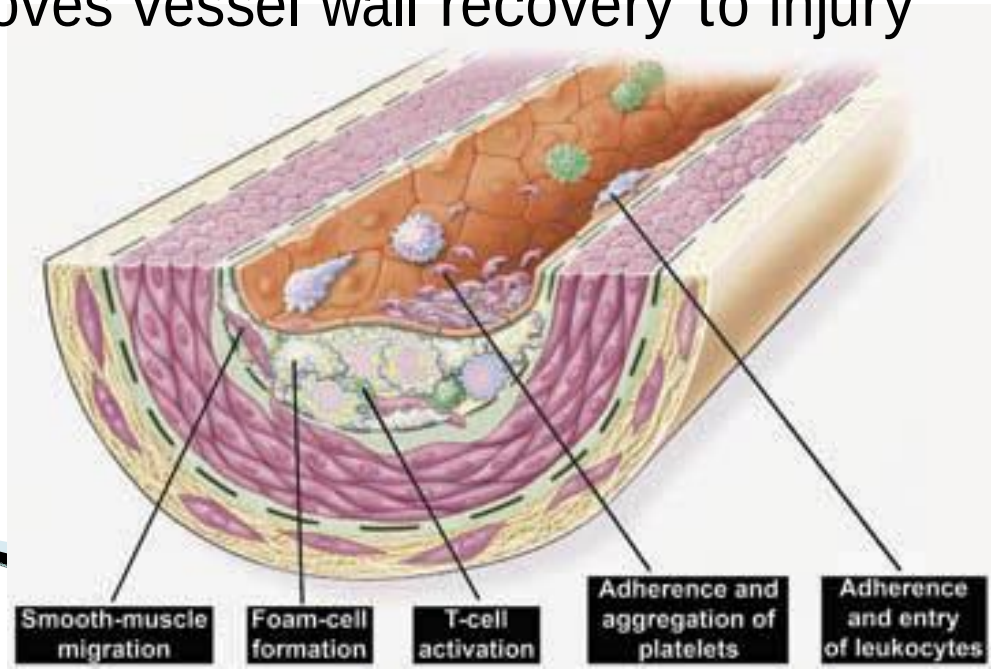
Vitamin D affects cancer cells in a number of ways:

- Switches apoptosis back on – programmed cell death
- Slows down multiplication and spread of cancer cells
- Reduces growth of new blood vessels to feed the cancer and increase spread



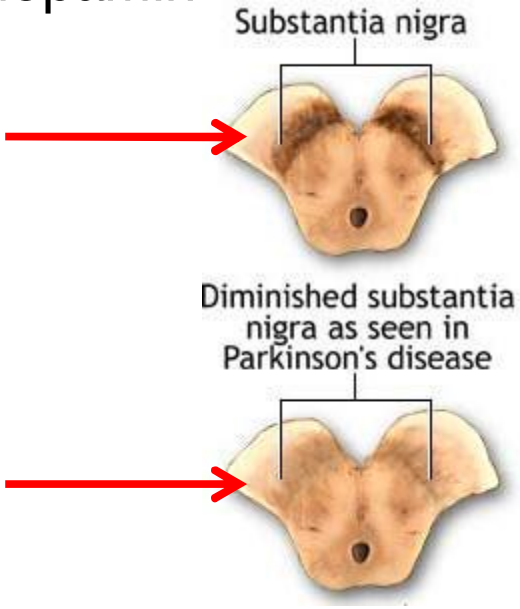
Vitamin D also seems to do all the right things for the heart.

- Vit D receptors in the artery walls and heart muscle
- Lowers BLOOD PRESSURE via the ACE system
- Improves insulin sensitivity
- Reduces inflammation
- Improves vessel wall recovery to injury



There are many diseases where low Vitamin D levels are found:

Parkinson's disease – reduced production of dopamine in the substantia nigra.



Archives of Neurology, March 2011
American Heart Association's (AHA) Annual Scientific Sessions, Chicago, IL November 15, 2010

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Diabetes Care. 2011 Ma

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Macular Degeneration – 59%

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Macular Degeneration – 59%

Depression is 11 TIMES as common in those with low vitamin D levels

Archives of Neurology, March 2011

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Diabetes Care. 2011 Ma

Once the diseases have developed,

Vitamin D levels still make a difference:

- High vit D Doubles the survival in people with colon cancer
- High vit D Reduces heart failure hospitalisation and mortality
- Women taking vitamin D lowered heart deaths by 33%
- Women given Vitamin D supplements reduced cancer by up to 60%

Am J Clin Nutr. 2007 Jun;85(6):1586-91.

Vitamin D and calcium supplementation reduces cancer risk: results of a randomized trial.

Lappe JM, Travers-Gustafson D, Davies KM, Recker RR, Heaney RP.

Osteoporosis Research Center, Creighton University, Omaha, NE 68131, USA. jmlappe@creighton.edu

Erratum in

Am J Clin Nutr. 2008 Mar;87(3):794.

Abstract

BACKGROUND: Numerous observational studies have found supplemental calcium and vitamin D to be associated with reduce
interventional studies to test this effect are lacking.

British Journal of Cancer September 15, 2009; 101(6):916-23

European Society of Cardiology (ESC) Congress 2010 August 28-September 1, 2010, Stockholm, Sweden

2nd annual conference on Cardiovascular Disease and Epidemiology Prevention in Honolulu, Hawaii. April 23, 2002

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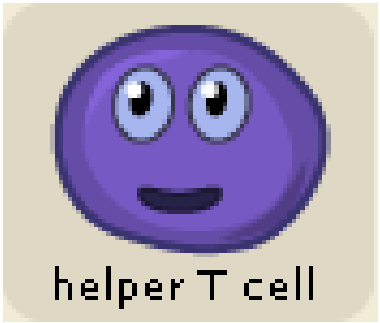
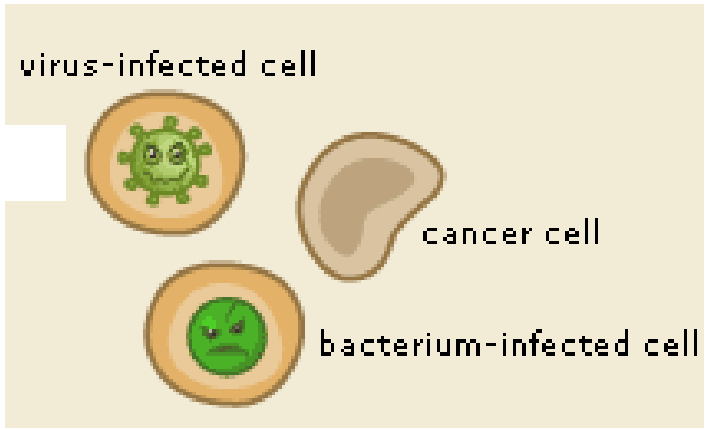
These results are almost too good to be true – BUT THEY ARE TRUE.

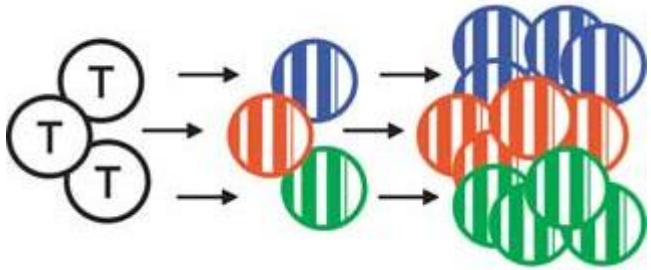
Vitamin D is essential for our immune system

When a ‘foreign’ protein or cell enters the body (virus, bacterium, cancer cell)
The ‘T’ white blood cells identify it turn into T KILLER cells to destroy it.





An army of specific killer cells attacks and kills the invader



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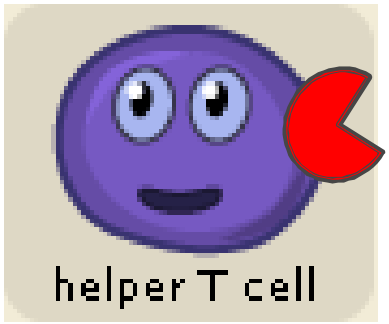
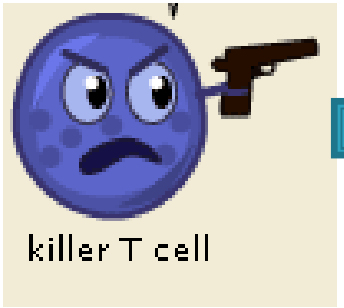
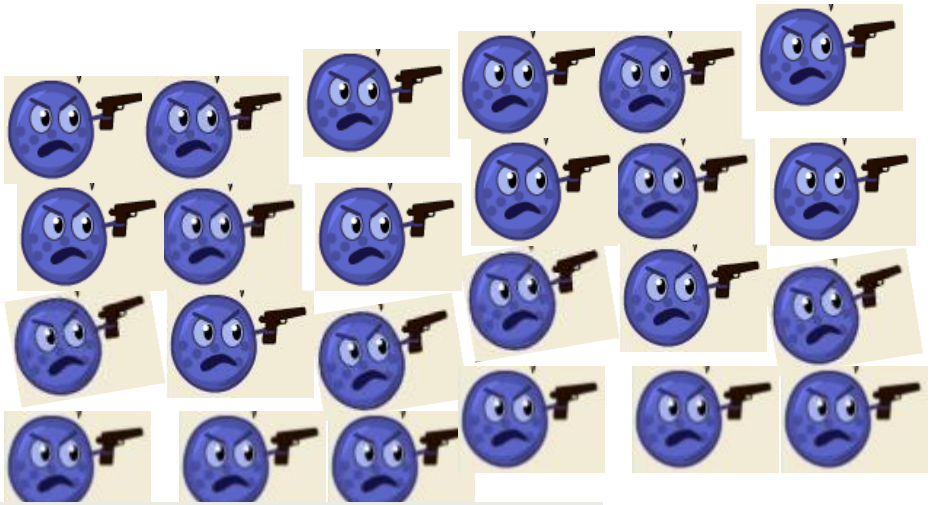


The T cells have vitamin D receptors on their surface, allowing them to transform into KILLER cells and also to multiply





The Telegraph

Health News

Vitamin D 'triggers and arms' the immune system

Vitamin D is crucial to the fending off of infections, claims new research.

Research from Copenhagen – May 2011

"Without vitamin D the white cells lie dormant!"

Whenever there is a risk of infection, make sure your Vitamin D levels are optimal.
Is it a coincidence that flu and infections are higher in the low sun winter months?

Canada Looks at Vitamin D for Swine Flu Protection

Posted By Dr. Mercola | August 27 2009 | 67,182 views

The Public Health Agency of Canada (PHAC) has confirmed that it will be investigating the role of vitamin D in protection against swine flu.
The agency started a study last year on the role of vitamin D in severe seasonal influenza, which it said it will now adapt to the H1N1 swine flu virus.

Part of the researchers' goal is to understand whether vitamin D levels are in any way responsible for the fact that most people with seasonal influenza develop a mild illness, but a small minority go on to develop severe symptoms.

According to PHAC, results from its study will indicate the extent and nature of the role of vitamin D in severe seasonal influenza.

Whenever there is a risk of infection, make sure your Vitamin D levels are optimal.

Is it a coincidence that flu and infections are higher in the low sun winter months?

Vitamin D switches on the production of over 200 antimicrobial peptides – the most important one we know of is CATHELICIDIN – a naturally occurring broad-spectrum antibiotic.

The list of illnesses benefitting from vitamin D grows by the day

Cancer	Hypertension	Heart disease
Autism	Obesity	Rheumatoid arthritis
Diabetes 1 and 2	Multiple Sclerosis	Crohn"s disease
Flu	Colds	Tuberculosis
Septicemia	Aging	Psoriasis
Eczema	Insomnia	Hearing loss
Muscle pain	Cavities	Periodontal disease
Athletic performance	Macular degeneration	Myopia
Pre-eclampsia	Seizures	Fertility
Asthma	Cystic fibrosis	Migraines
Depression	Alzheimer’s disease	Schizophrenia

How much vitamin D should we be taking?

(1) We can either get it from the sun

Or

(2) From our food and supplements

Unless you live near the equator – then (2) is essential

How much vitamin D do we need for optimal health?

NO ONE KNOWS.
Do we need more when we are ill?

30 minutes in the sun can create 25,000iu
Regular doses of 50,000iu have not shown any toxicity
BUT does more that 5,000 – 10,000 give any benefit ????

Recommendations from literature:

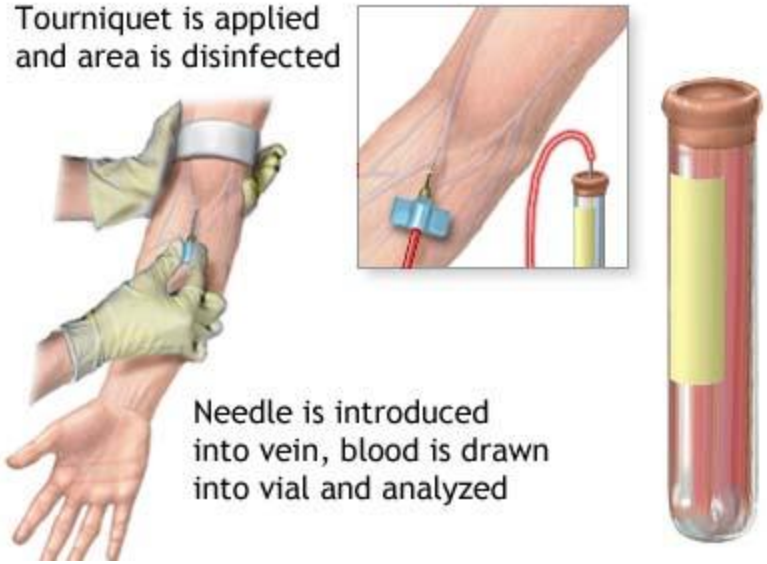
Adults and teens – 2,000 – 4,000iu/day
Children 400 – 1,000 iu/day
Pregnant women
and sick patients 5,000 iu/day **

**NB some cancers can raise the blood calcium level, so in cancer patients ask for calcium to be checked before starting and after being on high dose vitamin D

We can measure Vitamin D levels in the blood.

25 Hydroxy Vitamin D

Deficient	< 50 ng/ml
Normal	50 - 70
Optimal	70 - 100



But most laboratories will not do them.
NZ lab testing does not cover it.
So for ‘safety’ it is best to have an ideal intake.

It does make a difference!

In Finland – the UVB level
in the sun is weak even in mid summer,
and long winter months and cold, make sunbathing
not an option.

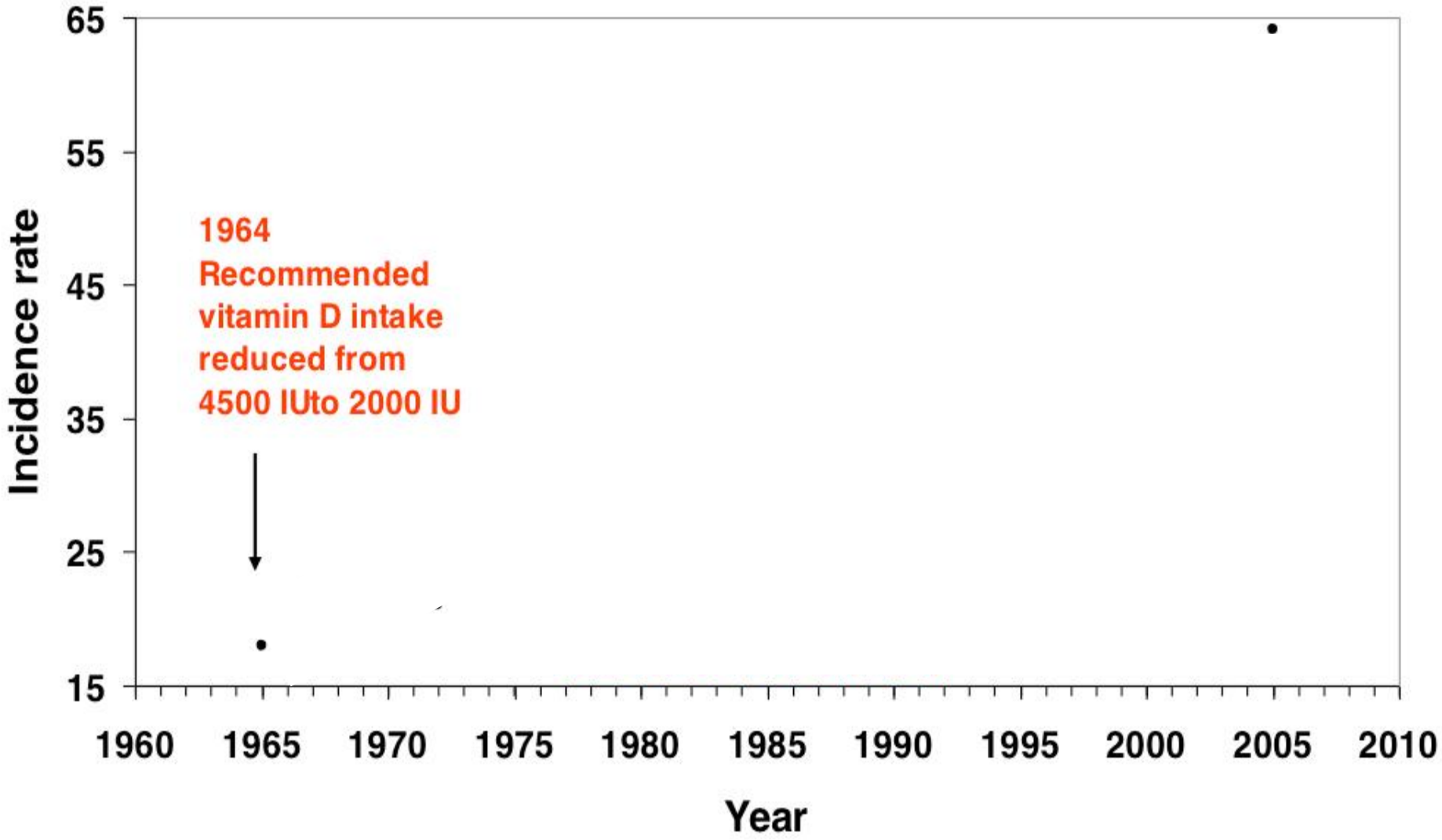
So Finnish children get their Vitamin D fix from their food.

Their wise government has recommended less and less vitamin D to be necessary (RDA) in their diet:
1960 - 4,500 IU/day 1964 - 2,000IU 1975 – 1,000IU
Then in 1992 – reduced it to the European RDA of 400IU/day

Just look what it did to diabetes in their kids!

Diabetes in Children under 14 in Finland 1965 - 1009

Annual age-adjusted incidence rates of type 1 diabetes, children ≤ 14 years old, per 100,000 population, and dates of changes in recommended daily intake of vitamin D in infants, Finland, 1965-2005



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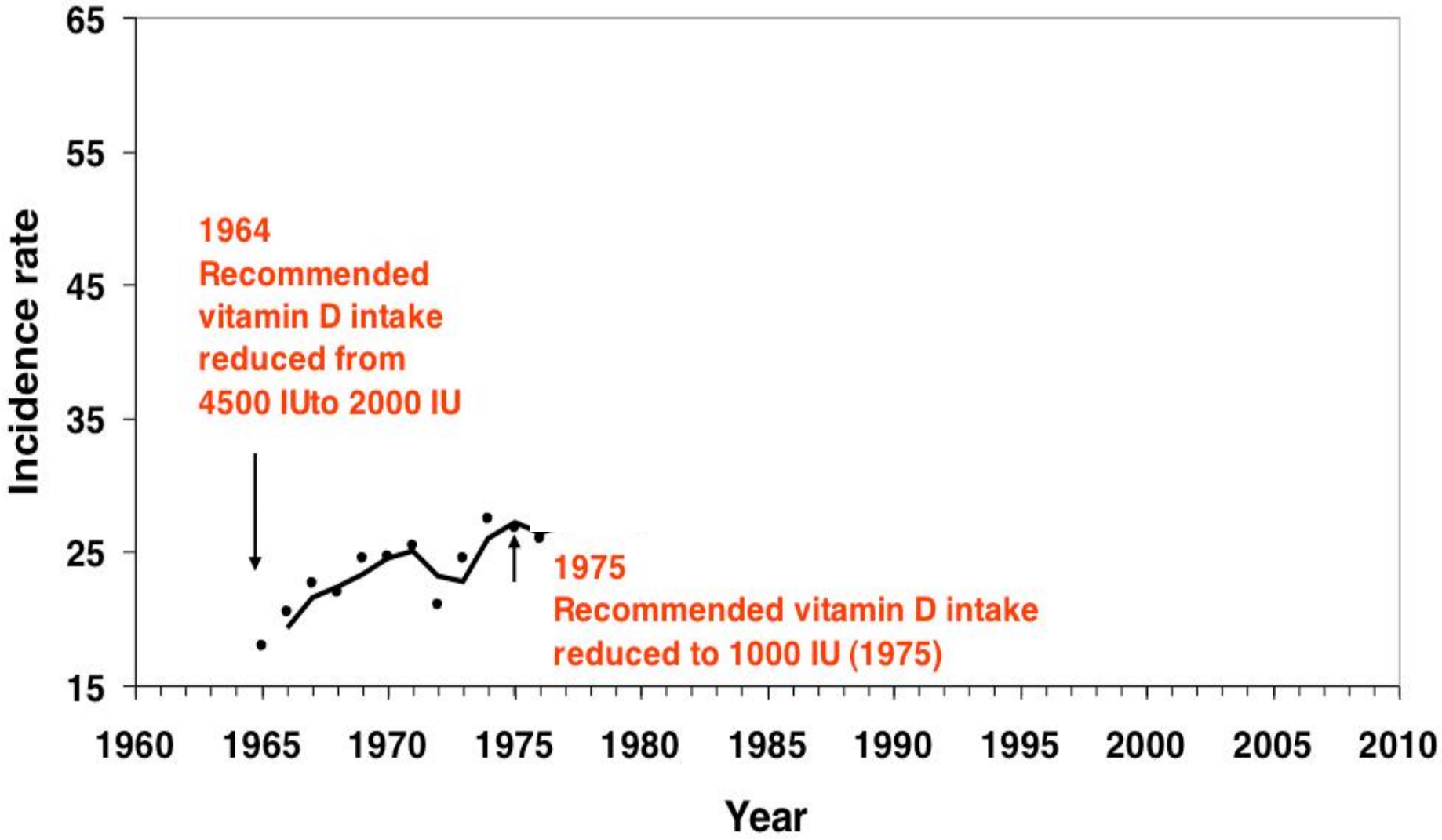

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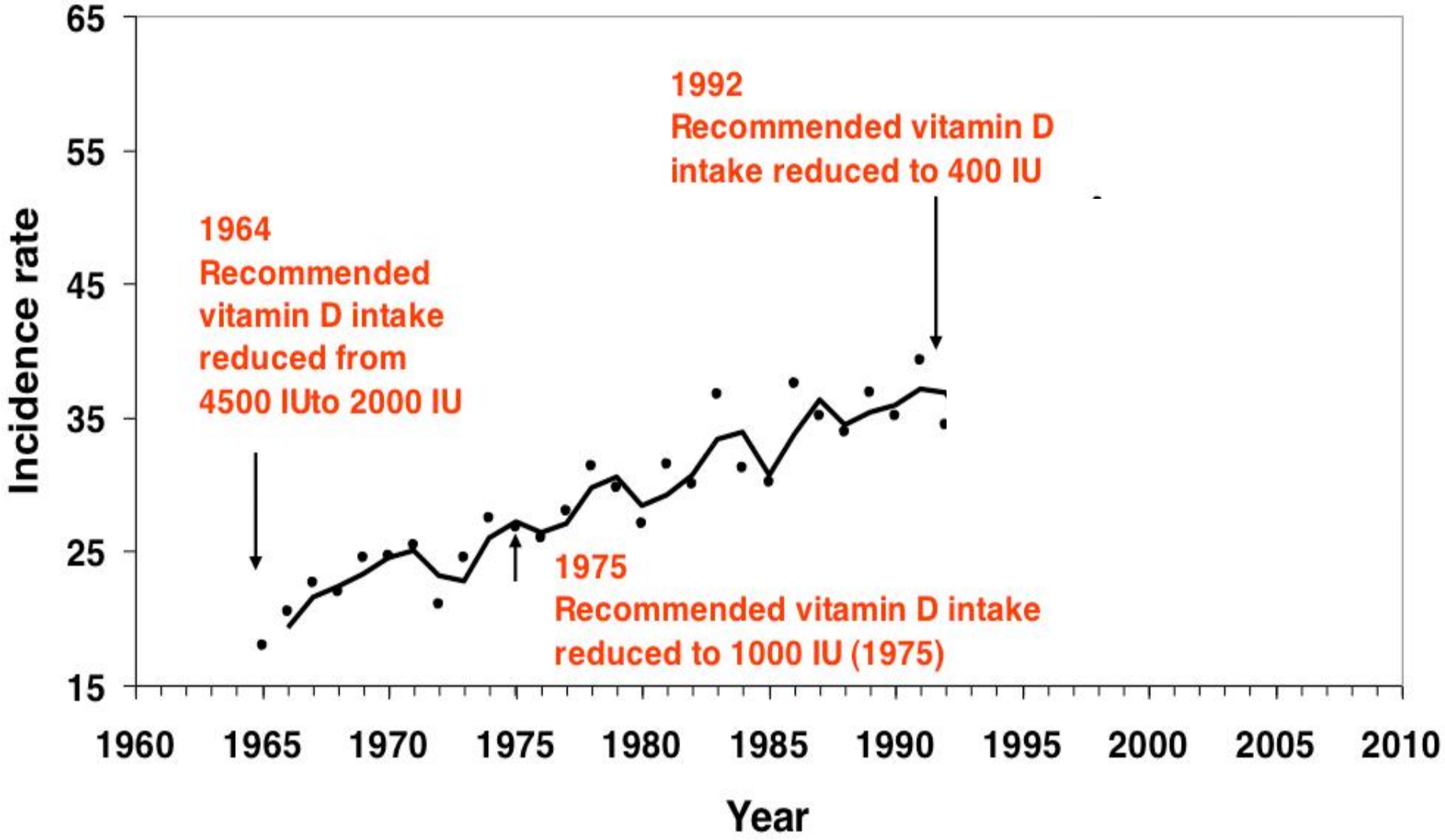


Can you get too much Vitamin D?

Is it a 'toxic' and dangerous vitamin?

The only reported side effect is high calcium in the blood and urine and kidney stones.

Usually when vitamin D **and** Calcium are given in high doses.

Calcium 2000mg / day

Vitamin D alone – up to 50,000iu/day has no toxic effect

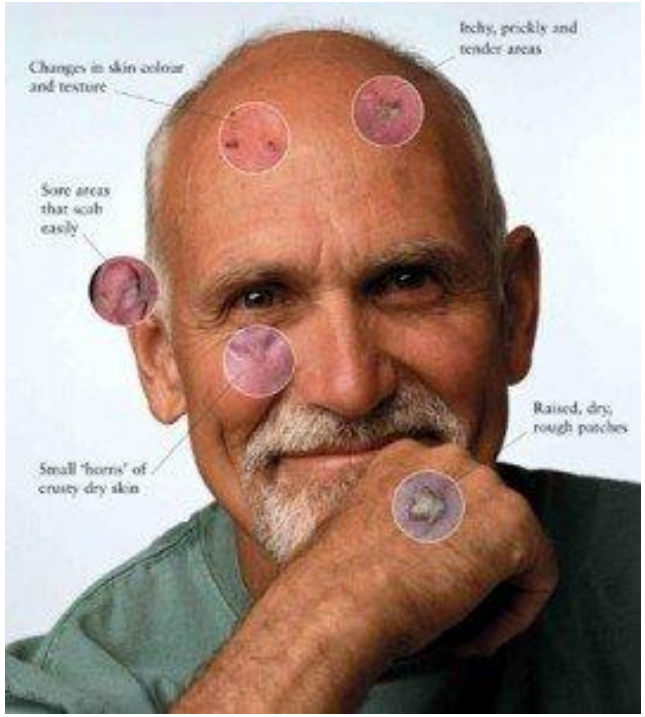
Sun exposure will NEVER reach toxic levels

Most people recommend 4,000 – 10,000iu/day depending on sun exposure.

There seems little benefit in going over 4,000iu (100ug) / day.

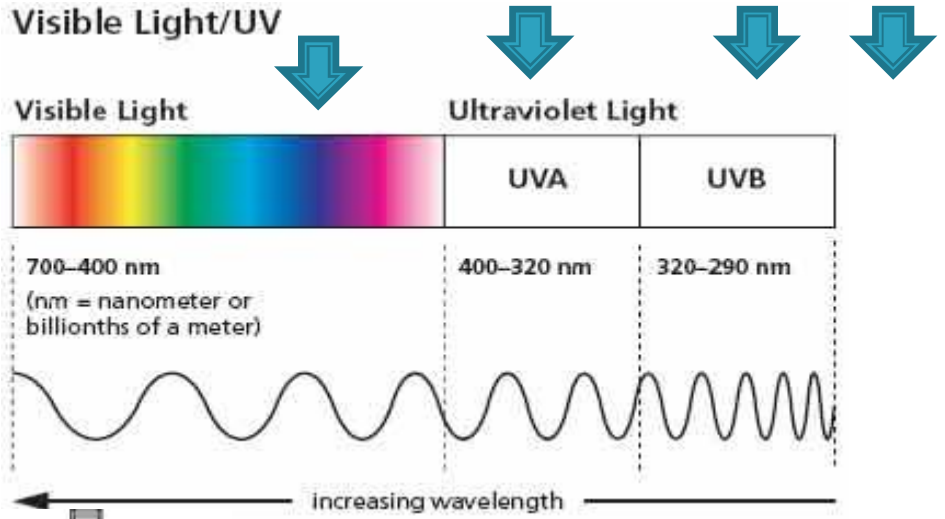
Should we sunbathe?

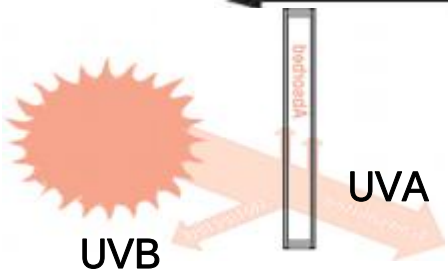
Whole body exposure to just before sunburn can create 10,000 – 25,000iu of vitamin D – but there is the risk of skin damage

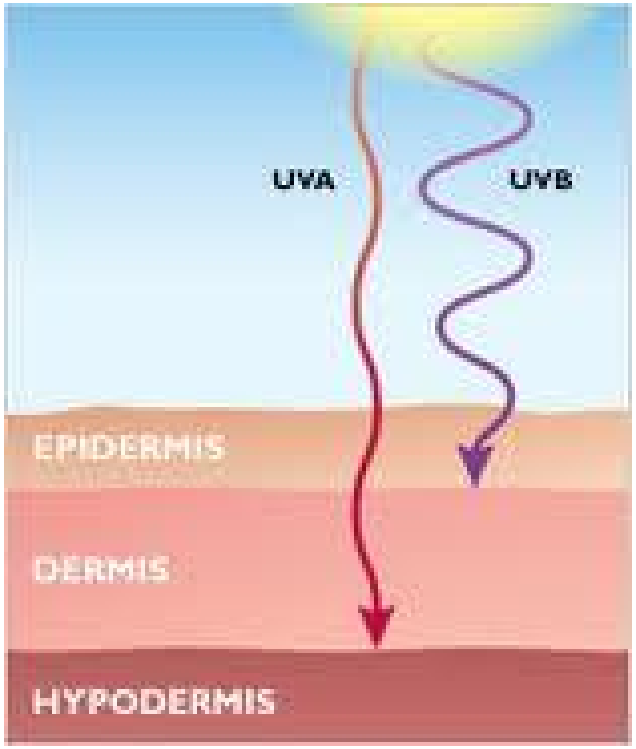


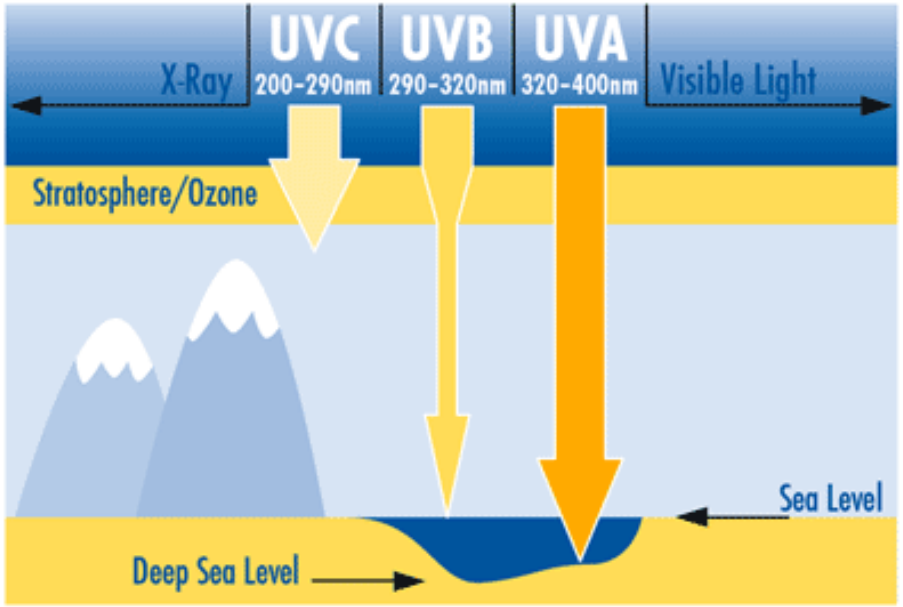
Light waves:
Visible 700-400
UV A – 400 – 320
UV B - 320 - 290

UV A – penetrates further
The atmosphere
Glass
The skin





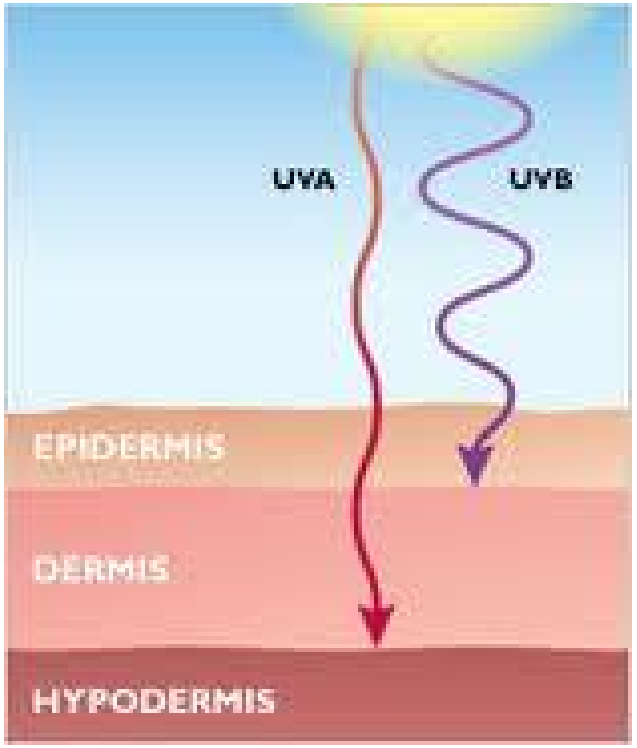




Skin Cancer: are caused by UV light

UVA – Skin cancers (squamous cell, and melanoma)

UVB – possible melanoma



So prolonged sun exposure can damage the skin, and cause cancer.

So the problem – a little sun exposure creates vitamin D and protects against many diseases including cancers

Too much can cause skin cancers.
The answer ------ moderation

The ‘best’ way to sunbathe:

Wear as little as ‘necessary’
Sunbathe in the middle hours of the day (between 10am and 2pm)

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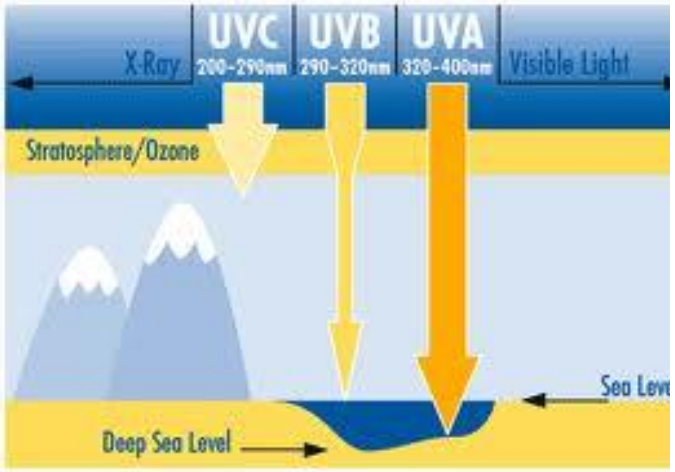
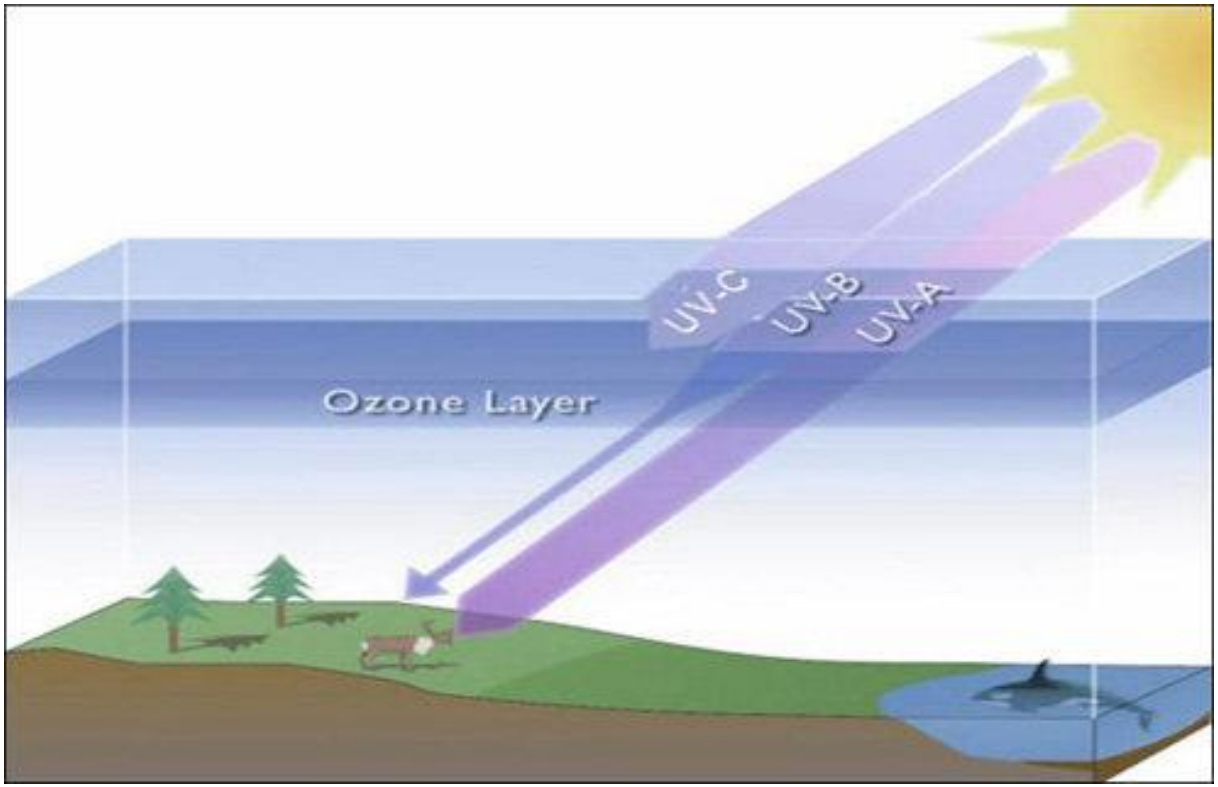


Wear as little as ‘necessary’
Sunbathe in the middle hours of the day (between 10am and 2pm)

With low sun the good UVB rays are filtered out and just the burning UVA get through



The ‘best’ way to sunbathe:

Wear as little as ‘necessary’
Sunbathe in the middle hours of the day (between 10am and 2pm)
Bathe until the earliest pink colour appears.

Do this 2-3 times per week if possible.

Usually just 20 – 30 minutes is plenty

Fair skinned people less and dark skinned more
Older people make less vitamin D
Body fat absorbs vitamin D, so obese people need more.
So dietary vitamin D is also important.

Foods rich in vitamin D

Fatty Fish	200iu	
Eggs	20iu	
Beef liver	15iu	
Milk	100iu	/8ml
Cod liver oil	1,360iu	/15 mls
Mushrooms	14iu	/100g

30 minutes in the sun creates the same Vitamin D as 200 glasses of milk

We need 2,000-4,000iu per day!

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1 teaspoon = 5 mls

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Sunbathe every day – challenging in winter
Use a UVB sunbed – with great care
Take 60mls of codliver oil daily

Or take a good Vitamin D supplement – 2,000 – 4,000iu daily

NZ Food safety authority – supplements must not contain more than 1,000iu/day 1985

What do I do?

Considering the potential benefits:
And almost negligible toxicity

I take vitamin D in the Multis,
Fish oils and Mg & Calcium (1,000iu)

Cancer	Hypertension	Heart disease
Autism	Obesity	Rheumatoid arthritis
Diabetes 1 and 2	Multiple Sclerosis	Crohn"s disease
Flu	Colds	Tuberculosis
Septicemia	Aging	Psoriasis
Eczema	Insomnia	Hearing loss
Muscle pain	Cavities	Periodontal disease
Athletic performance	Macular degeneration	Myopia
Pre-eclampsia	Seizures	Fertility
Asthma	Cystic fibrosis	Migraines
Depression	Alzheimer's disease	Schizophrenia

Plus 4 Vitamin D tablets daily

And enjoy a few minutes in the sun – when I can find it.

Daily dose of 5,000iu

There is no doubt –the most important vitamin we can take – is Vitamin D