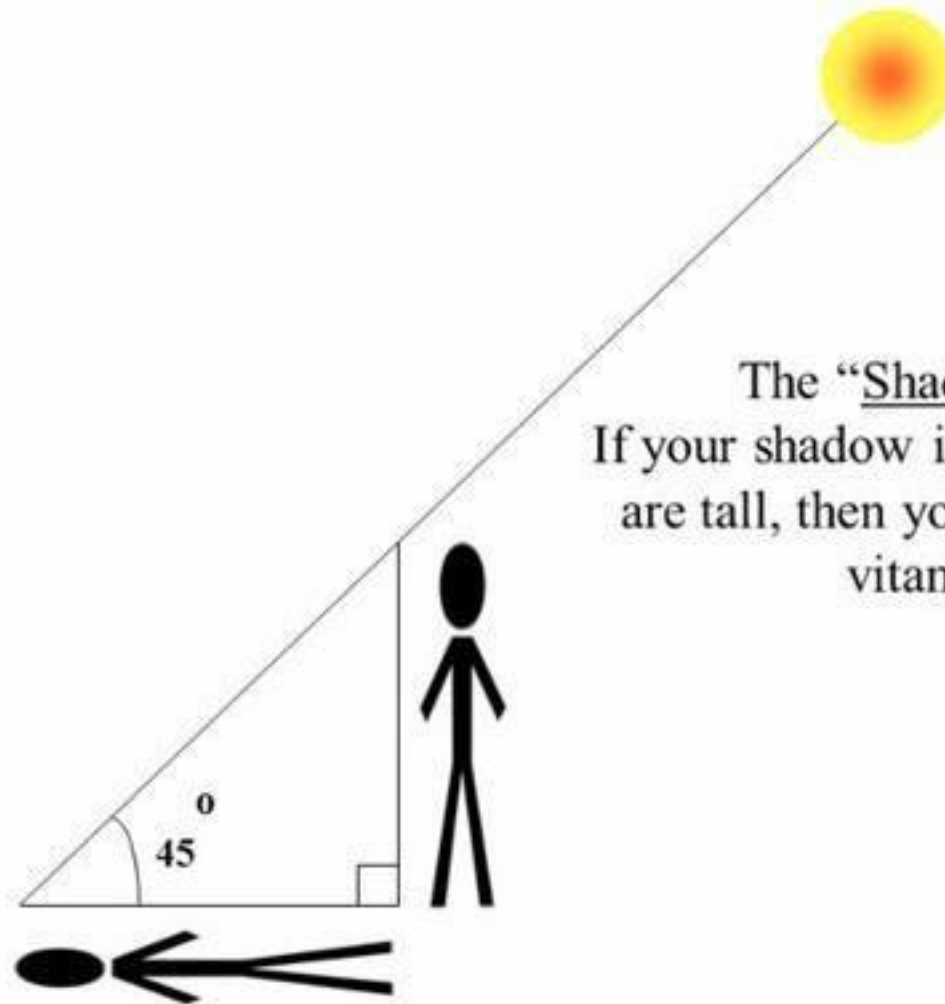


# Presentation to Jen Aliano Grassrootshealth

---

March 2nd, 2025)

Cícero Galli Coimbra, MD, PHD  
Neurologist, Associate Professor  
Federal University of São Paulo – UNIFESP



The “Shadow Rule”  
If your shadow is longer than you  
are tall, then you will not make  
vitamin D

Graphic prepared by Edward Gorham, Ph.D.

Dark-skinned individuals require about 5–10 times longer exposure to sunlight to produce vitamin D compared to fair-skinned individuals



The Lancet 1(8263):74-6 February 1982

Sunscreen with a sun protection factor of 15 blocks approximately 99% of the cutaneous vitamin D production



Sunscreens can contain **aluminum** hydroxide-coated titanium dioxide nanoparticles  
"NPs  $\leq$  4 nm **can penetrate and permeate intact skin**" - Regul Toxicol Pharmacol. 2015 Jul;72(2):310-22.

Vitamin D is not actually a vitamin; it is a steroid molecule.

It converts into a hormone in several of human cells and is needed by nearly all cells for their functions.

Low vitamin D levels play a role in the development of many diseases.

# Human Health - Google Scholar (2025) – “vitamin D”:

- **& human health:** 1,990,000 papers
- **& cancer:** 1,490,000 papers
- **& diabetes:** 1,320,000 papers
- **& insulin:** 375,000 papers
- **& cardiovascular:** 988,000 papers
- **& hypertension:** 387,000 papers
- **& obesity:** 630,000 papers
- **& psychiatric disorders:** 91,500 papers
- **& depression:** 234,000 papers
- **& psychosis:** 25,500 papers
- **& autism:** 30,300 papers
- **& ADHD:** 16,300 papers

WE Stumpf (2012):

*“Vitamin D is as fundamental as the sun,  
the closest we have to a ‘panacea’.”*



European Journal of Clinical Nutrition (2012) **66**, 1080–1081  
© 2012 Macmillan Publishers Limited All rights reserved 0954-3007/12

[www.nature.com/ejcn](http://www.nature.com/ejcn)


**EDITORIAL**

Vitamin D and the scientific calcium dogma: understanding the  
‘Panacea’ of the sun

<https://www.nature.com/articles/ejcn201278>



# Google Scholar (2025): Vitamin D & immune system → 540,000 papers



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**Vitamin D and the immune system**

C Aranow - Journal of investigative medicine, 2011 - journals.sagepub.com


... **immunity** while maintaining tolerance to self. The implications of **vitamin D** deficiency on the **immune system** have become clearer in recent years, and in the context of **vitamin D** ...

☆ Save  Cite Cited by 1794 Related articles All 14 versions

**Vitamin D and the immune system: new perspectives on an old theme**

M Hewison - Rheumatic Disease Clinics, 2012 - rheumatic.theclinics.com


... specific facets of human **immunity**. Details of this are reviewed and the possible effect of **vitamin D** insufficiency and **vitamin D** supplementation on normal **immune** function and human ...

☆ Save  Cite Cited by 1003 Related articles All 18 versions

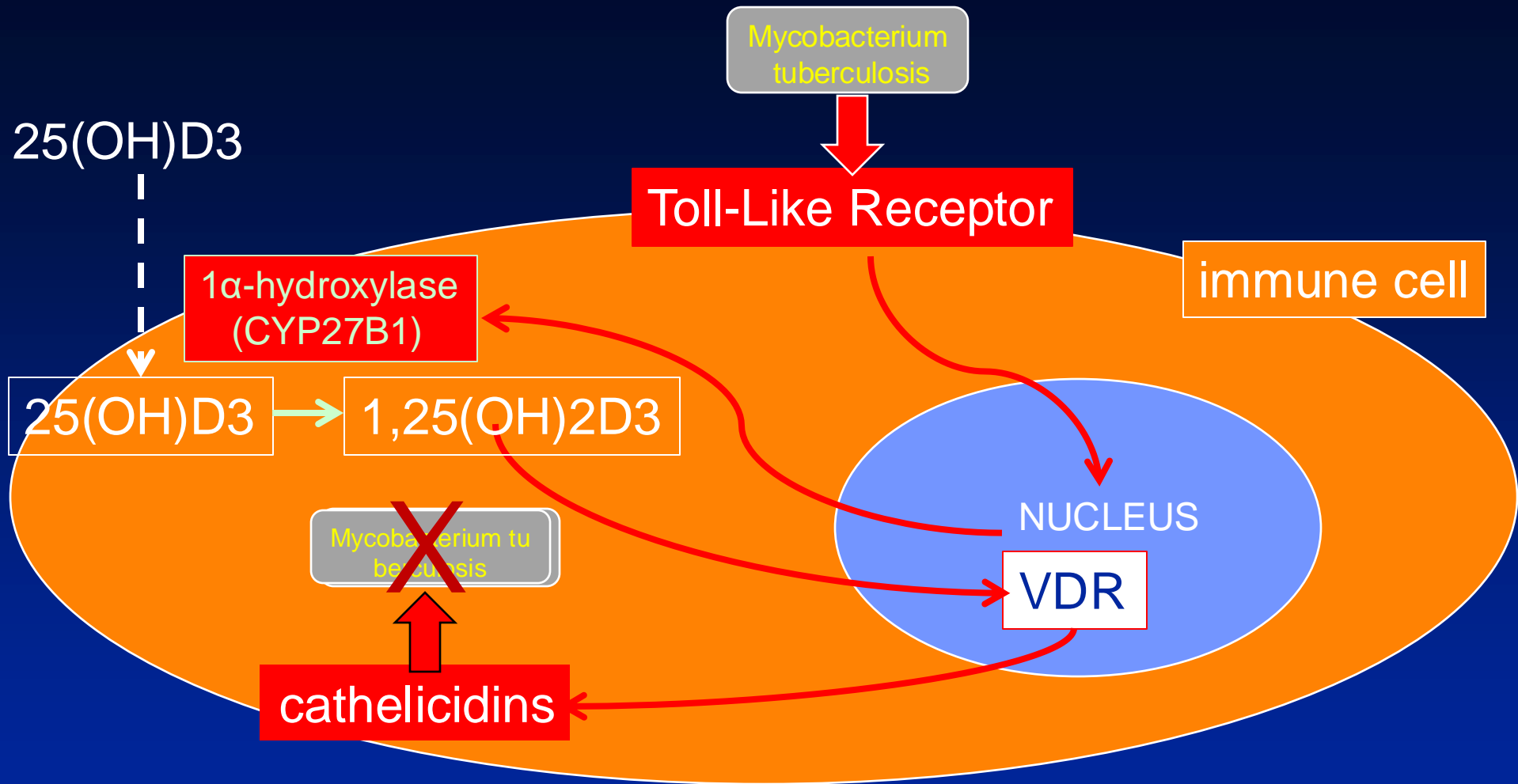
**Vitamin D: modulator of the immune system**

F Baeke, T Takiishi, H Korf, C Gysemans... - Current opinion in ..., 2010 - Elsevier

... the role of **vitamin D** as regulator of the **immune system**, including its effects on a cellular level. Furthermore, we give an overview of the immunological mechanisms linking **vitamin D** to ...

☆ Save  Cite Cited by 1834 Related articles All 10 versions





Liu PT et al. Toll-Like Receptor Triggering of a Vitamin D-Mediated Human Antimicrobial Response  
Science vol 311 24 March 2006

# Google Scholar (2025): Vitamin D & infectious diseases → 374,000 papers



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Review articles

☐ include patents

☒ include citations

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**Vitamin D signaling, infectious diseases, and regulation of innate immunity**  
[JH White](#) - **Infection** and immunity, 2008 - journals.asm.org  
... autoimmune and **infectious diseases** (80... **disease**, and type 1 diabetes, have also been documented (2, 15, 47, 59). Connections between **vitamin D** insufficiency and **infectious diseases** ...  
☆ Save Cite Cited by 532 Related articles All 14 versions

**Vitamin D for Treatment and Prevention of Infectious Diseases; a systematic review of Randomized controlled trials**  
[AV Yamshchikov](#), [NS Desai](#), [HM Blumberg](#), [TR Ziegler](#)... - Endocrine Practice, 2009 - Elsevier  
Objective To review the existing human controlled intervention studies of **vitamin D** as adjunctive therapy in settings of **infection** and provide recommendations for design and ...  
☆ Save Cite Cited by 460 Related articles All 11 versions

**Vitamin D and infectious diseases**  
[G Miragliotta](#), [L Miragliotta](#) - Endocrine, Metabolic & Immune ..., 2014 - benthamdirect.com  
... with higher mortality rate for respiratory **disease**. In this regard, either ... low **vitamin D** level and the incidence of respiratory tract **infections** (RTIs) or clinical trials on the effect of **vitamin D** ...  
☆ Save Cite Cited by 25 Related articles All 5 versions

# Infectious diseases - Google Scholar (2025) – “vitamin D”:

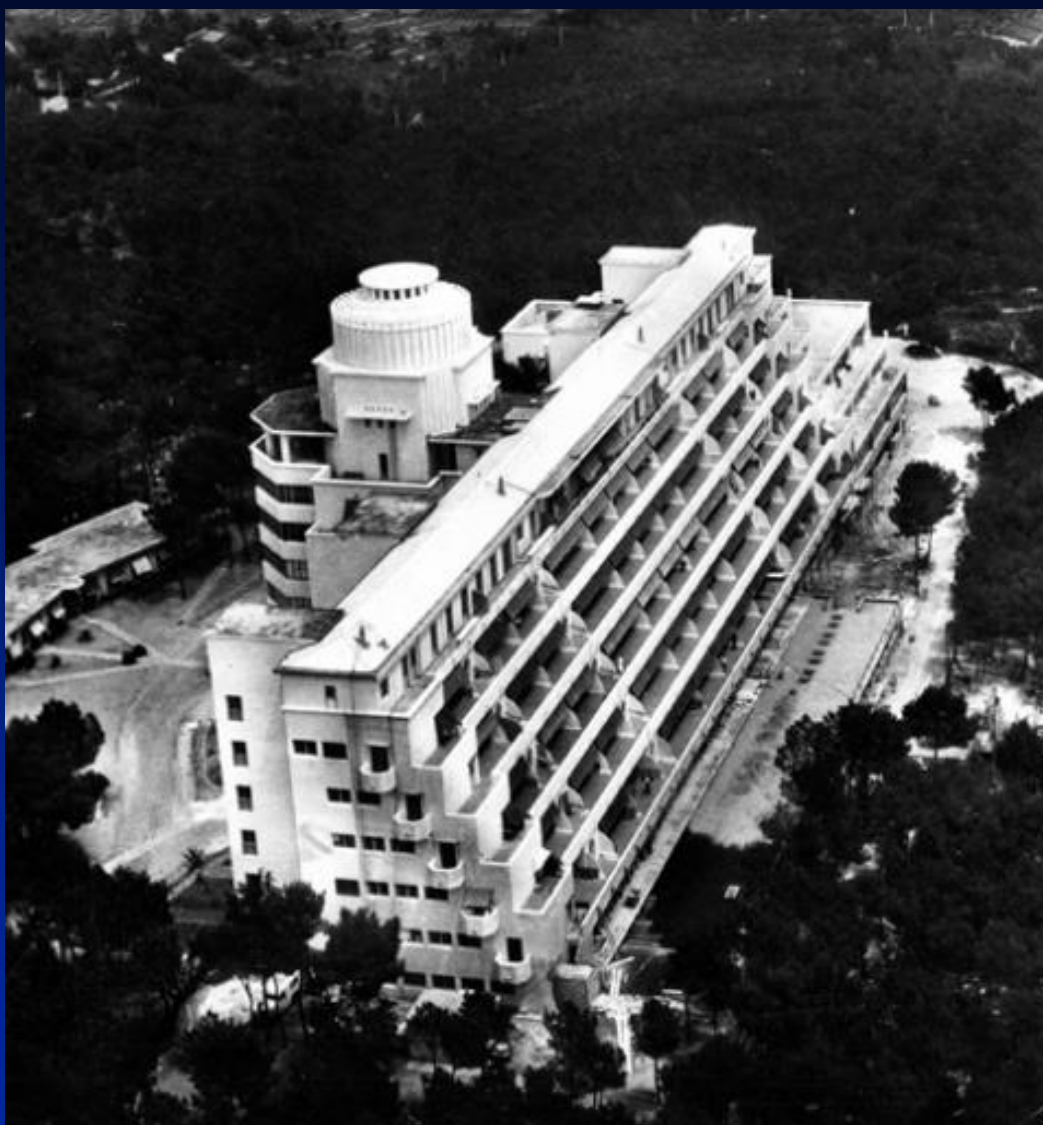
- ❑ **& “infectious”**: 420,000 papers
- ❑ **& COVID-19**: 128,000 papers
- ❑ **& tuberculosis**: 121,000 papers
- ❑ **& HIV**: 119,000 papers
- ❑ **& pneumonia**: 60,500 papers
- ❑ **& influenza**: 48,800 papers
- ❑ **& Haemophilus influenzae**: 22,200 papers
- ❑ **& meningitis**: 23,800 papers
- ❑ **& Epstein-Barr**: 22,900 papers
- ❑ **& Respiratory Syncytial Virus (SRV)**: 12,100 papers
- ❑ **& common cold**: 10,800 papers
- ❑ **& dengue**: 9,950 papers



Auguste Rollier  
heliotherapy for  
tuberculosis



Dr. Auguste Rollier  
(1874-1954)



<http://insitu.revues.org/11102>





## Patients rebuilt: Dr Auguste Rollier's heliotherapeutic portraits

<https://mh.bmj.com/content/39/1/38.long>



“Four-year-old patient with thirty-four foci of osteitis-periostitis, adenitis, numerous ulcers, advanced tuberculosis of both feet, right hand, left lung, peritonitis, cachexia.” The lowered left shoulder indicates rickets.



The same patient, one year later. Healing of ulcers, reconstruction of bones, muscles, and general condition.



What happened to the sanatoriums? They were fitted with glass windows!

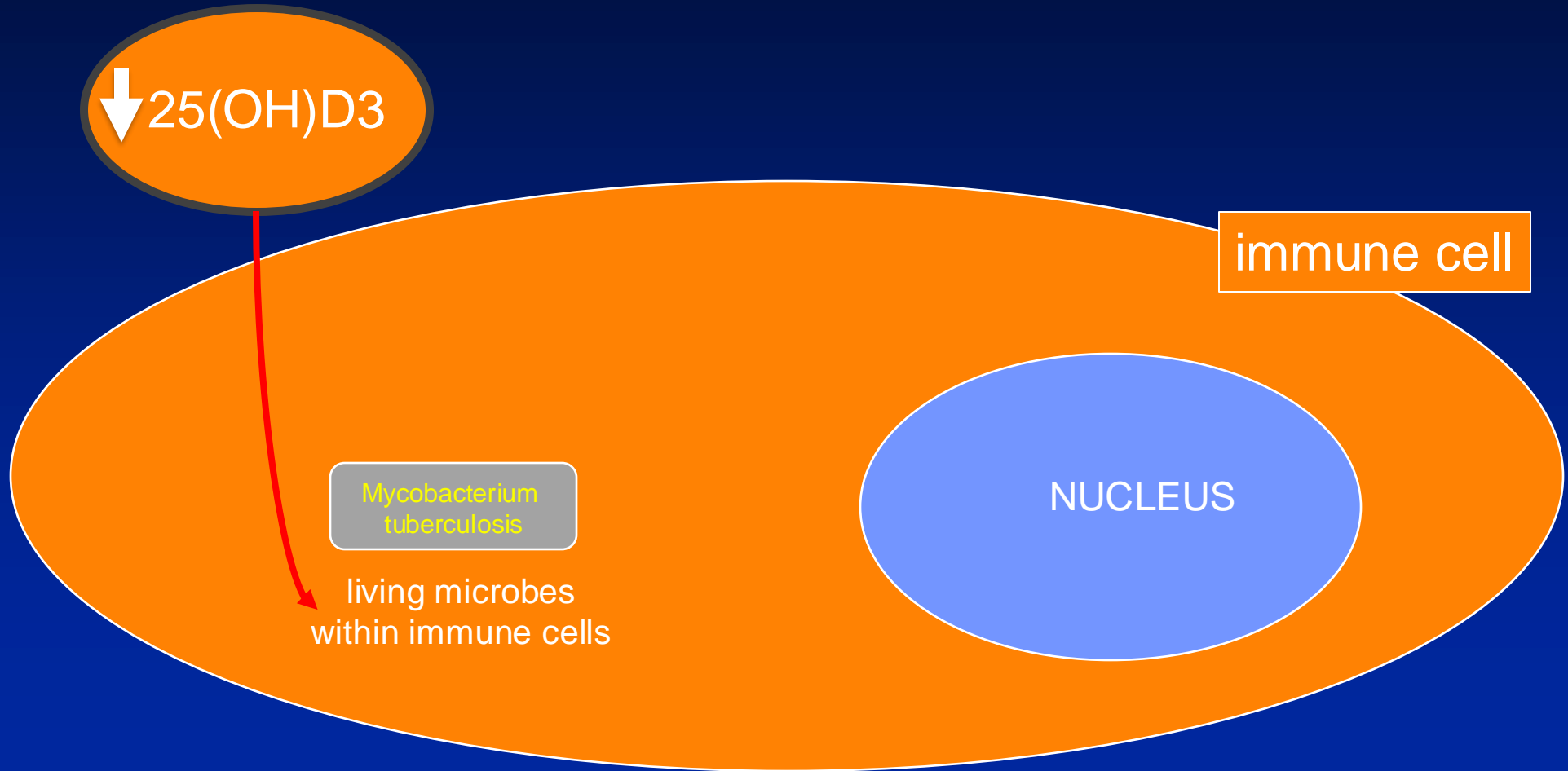


<http://ctsi.ucla.edu/education/files/view/training/docs/LiuRI.pdf>

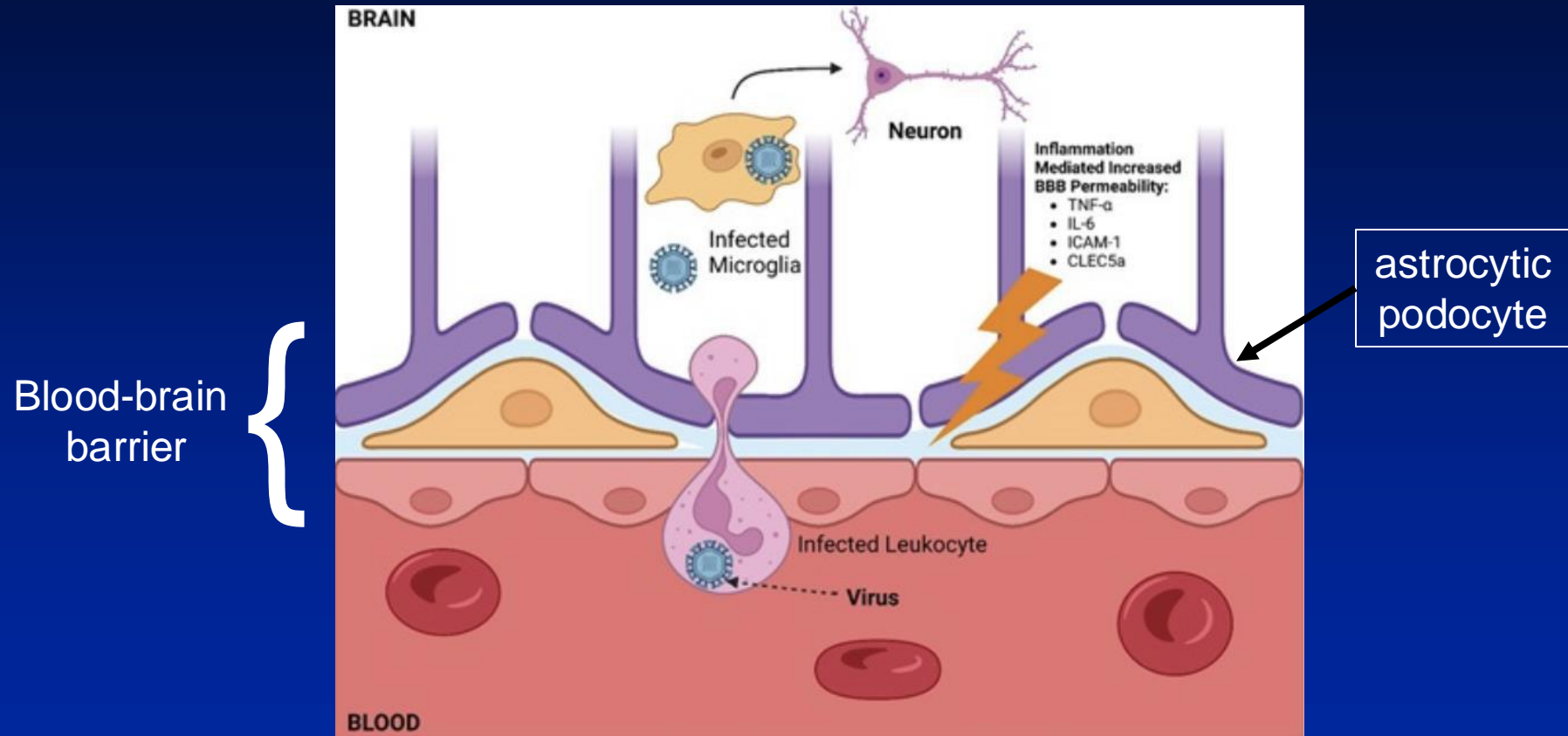
...and the Swiss sanatoriums turned into hotels



Low vitamin D leads to low cathelicidin synthesis,  
allowing microbes to remain alive within immune cells.



**The Trojan horse mechanism:** when vitamin D levels are low, microbes can survive and infiltrate the blood-brain and placental barriers within immune cells, infecting the brain and the fetus.



Srichawla et al, Annals of Medicine & Surgery 85(6): pp2761-2766, June 2023



# September 2018: WHO calls for urgent action to end the tuberculosis epidemic

Prior to the Covid-19 pandemic, tuberculosis was the deadliest infectious disease, claiming 4,000 lives each day worldwide



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News Health Policy News

## WHO calls for urgent action to end the tuberculosis epidemic

20th September 2018



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**Everything you need to know about the annual MPS therapy week**

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4th September 2019

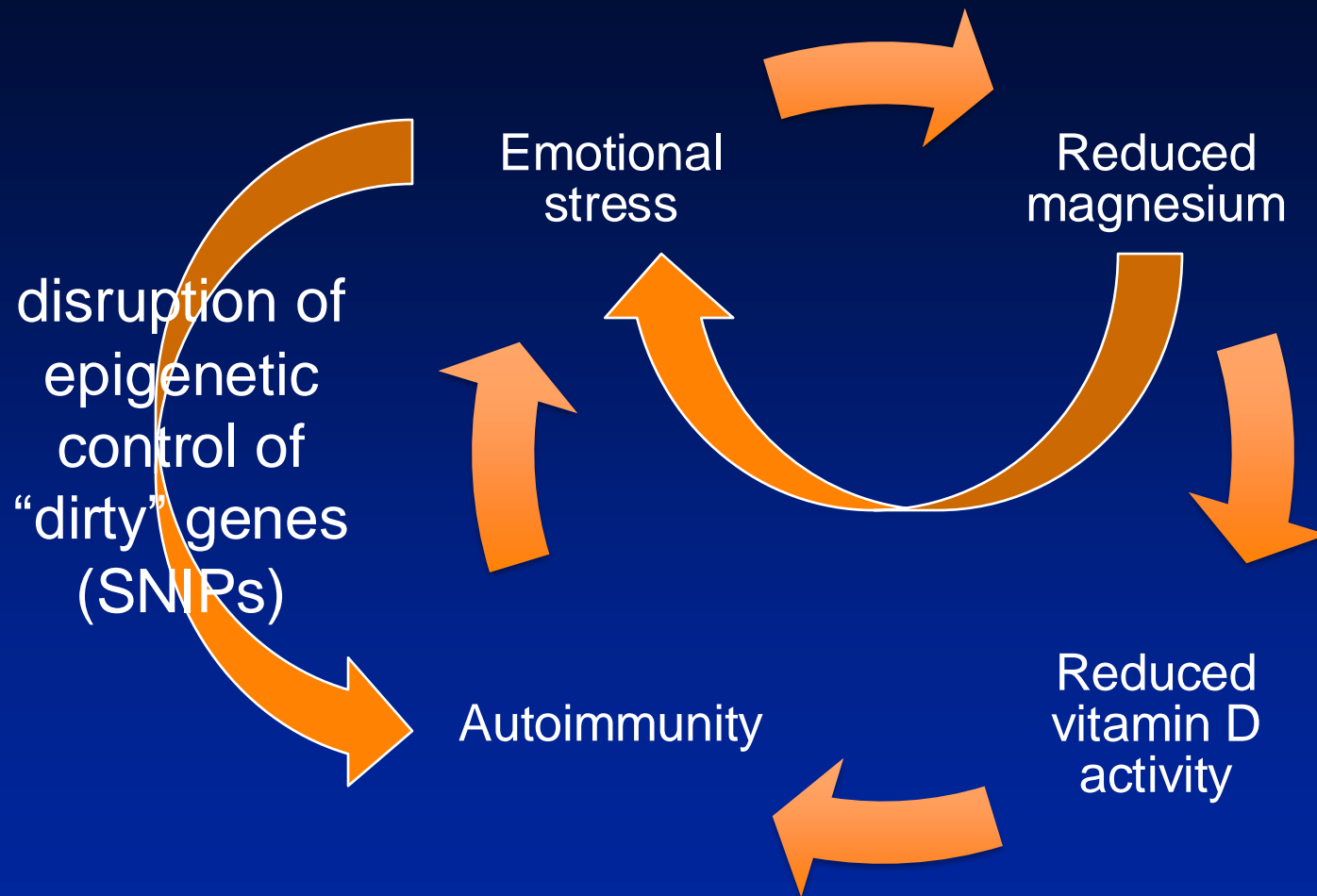


**Meeting the challenges**

<https://www.healtheuropa.eu/tuberculosis-epidemic/88174/>




Autoimmune diseases are almost always triggered by stressful life events, and managing emotional stress should be regarded as essential for the success of all therapeutic approaches





# Google Scholar (2025): autoimmune & “stressful life events” → 11,800 papers



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
Review articles

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Association between **stressful life events** and **autoimmune** diseases: A systematic review and meta-analysis of retrospective case–control studies

B Porcelli, A Pozza, N Bizzaro, [A Fagiolini](#)... - **Autoimmunity** ..., 2016 - Elsevier


... on the association between **stressful life events** and **autoimmune** diseases by a systematic ... with **autoimmune** diseases reported a significantly higher number of **stressful life events** in the ...

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Life events, caregiving, and risk of **autoimmune** rheumatic diseases in the women's health initiative observational study

[CG Parks](#), M Pettinger, [AJ de Roos](#)... - **Arthritis Care & ...**, 2023 - Wiley Online Library

... We hypothesized that having more **stressful life events** and caregiving might contribute to risk of developing RA or SLE. We also examined specific types of life events and in secondary ...

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“The results of this meta-analysis suggest that *stressors* may play an important role in the etiopathogenesis of autoimmune disorders.”





Autoimmunity Reviews  
Volume 15, Issue 4, April 2016, Pages 325-334




Review

## Association between stressful life events and autoimmune diseases: A systematic review and meta-analysis of retrospective case–control studies

Brunetta Porcelli <sup>a</sup>  , Andrea Pozza <sup>b</sup>, Nicola Bizzaro <sup>c</sup>, Andrea Fagiolini <sup>d</sup>,  
Maria-Cristina Costantini <sup>e</sup>, Lucia Terzuoli <sup>a</sup>, Fabio Ferretti <sup>b</sup>

<https://www.sciencedirect.com/science/article/abs/pii/S1568997215002621>

# Google Scholar (2025): Vitamin D & autoimmune diseases → 224,000 papers



Articles

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Review articles

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**The complex role of vitamin D in autoimmune diseases**

[P Szodoray](#), B Nakken, J Gaal... - Scandinavian ..., 2008 - Wiley Online Library


... of **autoimmune diseases**, but active **vitamin D** and its analogues are to some extent sufficient in the treatment of these **diseases**. ... the recurrence of the **autoimmune disease** after islet-cell ...

☆ Save  Cite Cited by 346 Related articles All 10 versions

**Vitamin D, autoimmune disease and rheumatoid arthritis**

SR Harrison, D Li, LE Jeffery, [K Raza](#)... - Calcified tissue ..., 2020 - Springer


... **vitamin D** deficiency has been linked to various **autoimmune** ... activities of **vitamin D** that impact **autoimmune disease**, with ... mechanisms linking **vitamin D** with **autoimmune disease**, the ...

☆ Save  Cite Cited by 266 Related articles All 15 versions

**Vitamin D and autoimmune diseases**

[R Illescas-Montes](#), [L Melguizo-Rodríguez](#), [C Ruiz](#)... - Life sciences, 2019 - Elsevier

... **Vitamin D** insufficiency has been described as an ... these **diseases**, although the optimal **vitamin D** dose remains controversial. We highlight the importance of measuring serum **vitamin D** ...


☆ Save  Cite Cited by 137 Related articles All 7 versions

## Autoimmune diseases - Google Scholar (2025) – “vitamin D”:

- **& “autoimmune”**: 327,000 papers
- **& rheumatoid arthritis**: 157,000 papers
- **& “multiple sclerosis”**: 83,300 papers / **& myelin**: 27,600 papers
- **& systemic sclerosis**: 79,300 papers
- **& Hashimoto's thyroiditis**: 82,000 papers
- **& lupus**: 74,500 papers
- **& psoriasis**: 62,400 papers
- **& myasthenia**: 60,500 papers
- **& Crohn's disease**: 47,200 papers
- **& Sjögren**: 18,400 papers
- **& rectocolitis**: 18,600 papers
- **& uveitis**: 11,100 papers



# Google Scholar (2025): Autoimmune diseases are mediated by an abnormal immune response known as “Th17” → 284,000 papers

autoimmune Th17

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Review articles

**Autoimmune inflammation from the Th17 perspective**  
J Furuzawa-Carballeda, MI Vargas-Rojas... - **Autoimmunity** reviews, 2007 - Elsevier  
... **Th17** T cell lineage and examine its link with the IL-17/IL-23 axis, particularly in the pathogenesis of collagen-induced arthritis (CIA) and experimental **autoimmune** ... human **autoimmune** ...  
☆ Save  Cite Cited by 419 Related articles All 5 versions

**Th17 response and inflammatory autoimmune diseases**  
JC Waite, D Skokos - **International journal of inflammation**, 2012 - Wiley Online Library  
... for **Th17** cells in the autoinflammatory disorder adult-onset Still's disease (AOSD). Whether **Th17** ... In this paper, we discuss the biology of **Th17** cells, their role in **autoimmune** disease ...  
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# Google Scholar (2025): Vitamin D inhibits Th17 → 31,100 papers



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[\[HTML\] Vitamin D, Th17 lymphocytes, and breast cancer](#)  
B Filip-Psurska, H Zachary, A Strzykalska, J Wietrzyk - Cancers, 2022 - mdpi.com  
... The effect of **vitamin D** on **Th17** cells may depend on ... of **vitamin D** treatment failure or success. Therefore, in this review, we present data describing the effects of **vitamin D** 3 on **Th17** ...  
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[\[HTML\] Vitamin D suppresses Th17 cytokine production by inducing C/EBP homologous protein \(CHOP\) expression](#)  
SH Chang, Y Chung, C Dong - Journal of biological chemistry, 2010 - Elsevier  
... At a lower concentration of 1,25D3, **Th17** cells can suppress the production of cytokines ... **Th17** cells, this report proposes a novel regulatory pathway of **Th17** cytokines via **vitamin D**. ...  
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[Vitamin D reduces the differentiation and expansion of Th17 cells in young asthmatic children](#)  
A Hamzaoui, A Berraïes, B Hamdi, W Kaabachi... - Immunobiology, 2014 - Elsevier  
... **Vitamin D** inhibits the molecules associated with **Th17** cell effector function. Naive CD4 + T cells from BD patients (n = 10) were cultured under **Th17** polarizing conditions with 25(OH)...  
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## **REPORT**

# **Vitamin D Suppresses Th17 Cytokine Production by Inducing C/EBP Homologous Protein (CHOP) Expression\***

Received for publication, September 16, 2010, and in revised form, October 22, 2010  
Published, JBC Papers in Press, October 25, 2010, DOI 10.1074/jbc.C110.185777

**Seon Hee Chang, Yeonseok Chung<sup>1</sup>, and Chen Dong<sup>2</sup>**

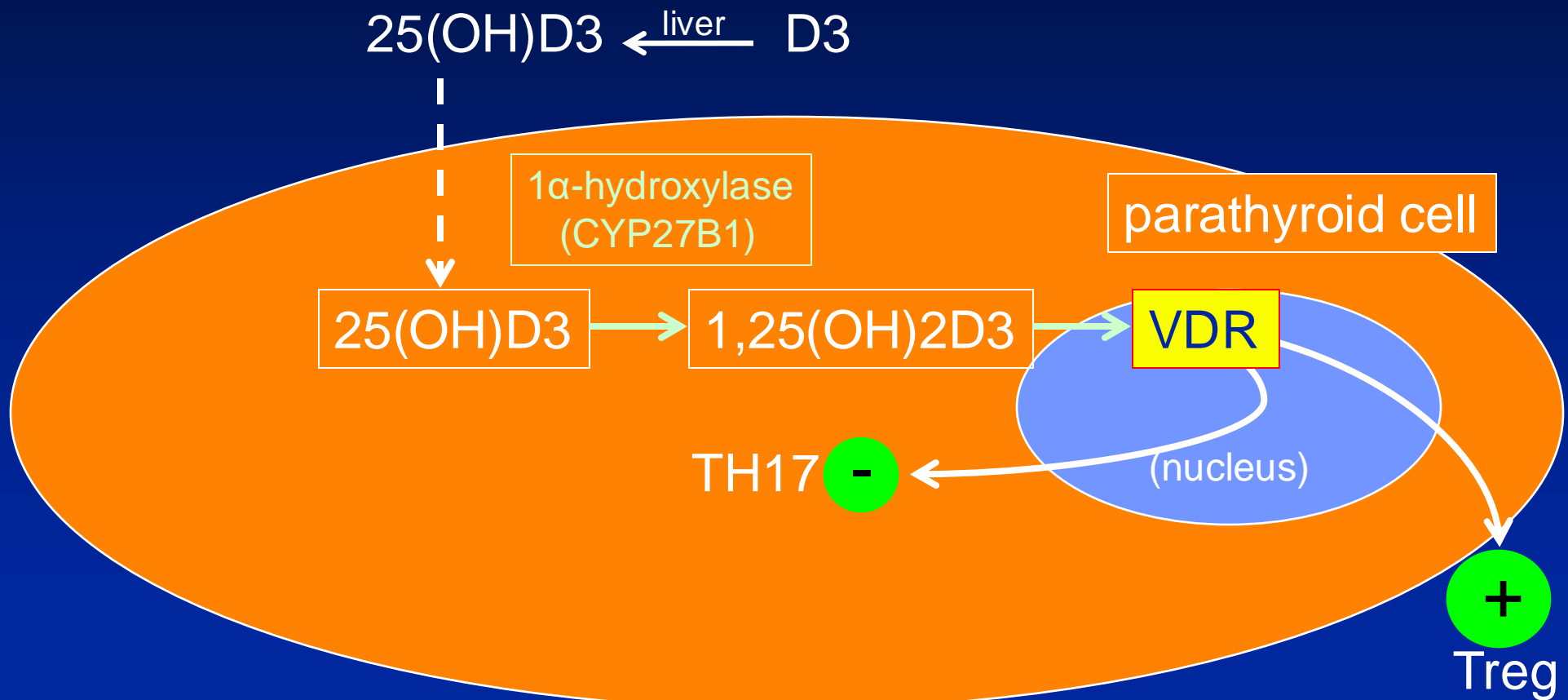
*From the Department of Immunology and Center for Inflammation and Cancer, The University of Texas, MD Anderson Cancer Center, Houston, Texas 77054*

**Vitamin D  
Suppresses  
Interleukin-17  
Production**


“THE JOURNAL OF BIOLOGICAL CHEMISTRY VOL. 285, NO. 50, pp. 38751–38755, December 10, 2010”



# Metabolism of vitamin D within immune cells



# Google Scholar (2025): Vitamin D inhibits TH17 → 31,400 papers



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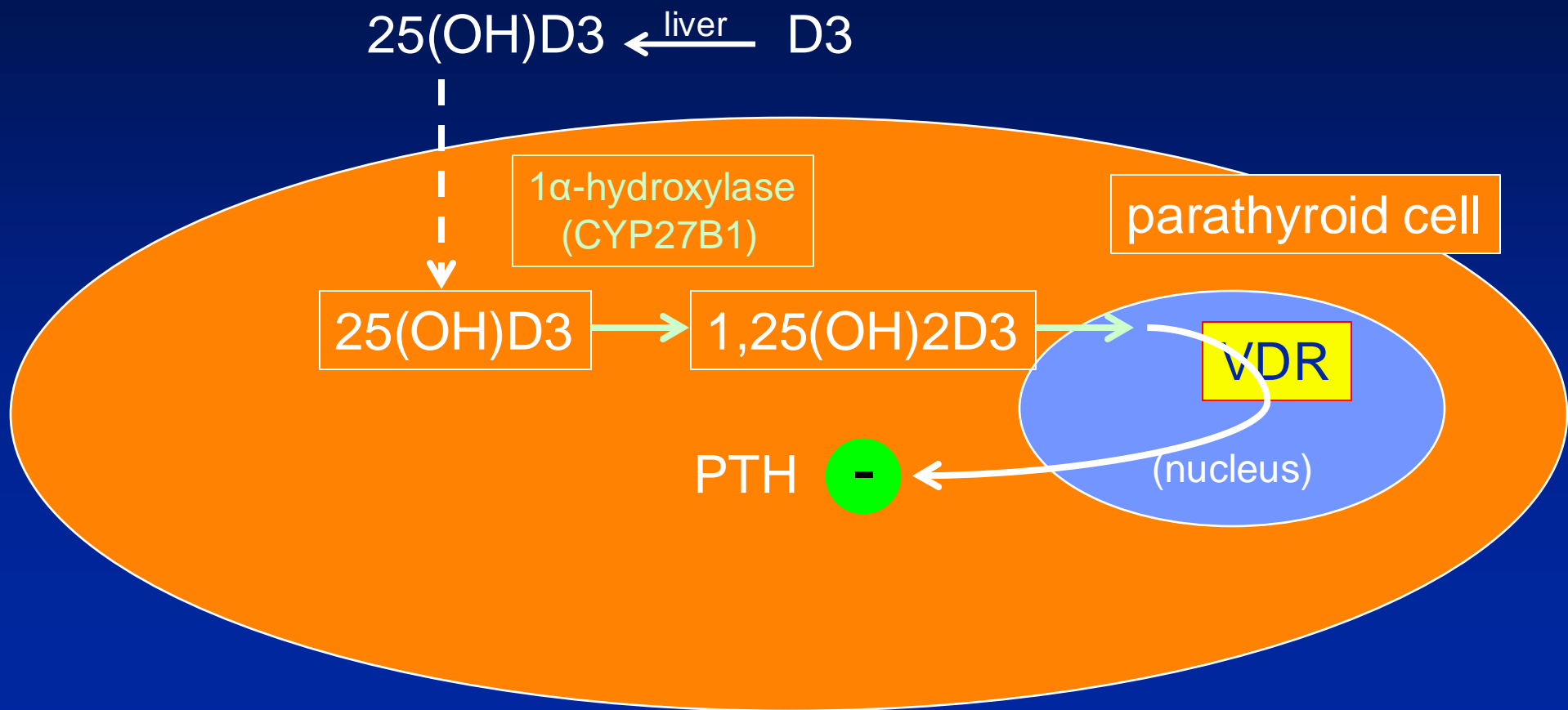
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[\[HTML\] Vitamin D, Th17 lymphocytes, and breast cancer](#)  
[B Filip-Psurska, H Zachary, A Strzykalska, J Wietrzyk - Cancers, 2022 - mdpi.com](#)  
... The effect of **vitamin D** on **Th17** cells may depend on ... of **vitamin D** treatment failure or success. Therefore, in this review, we present data describing the effects of **vitamin D** 3 on **Th17** ...  
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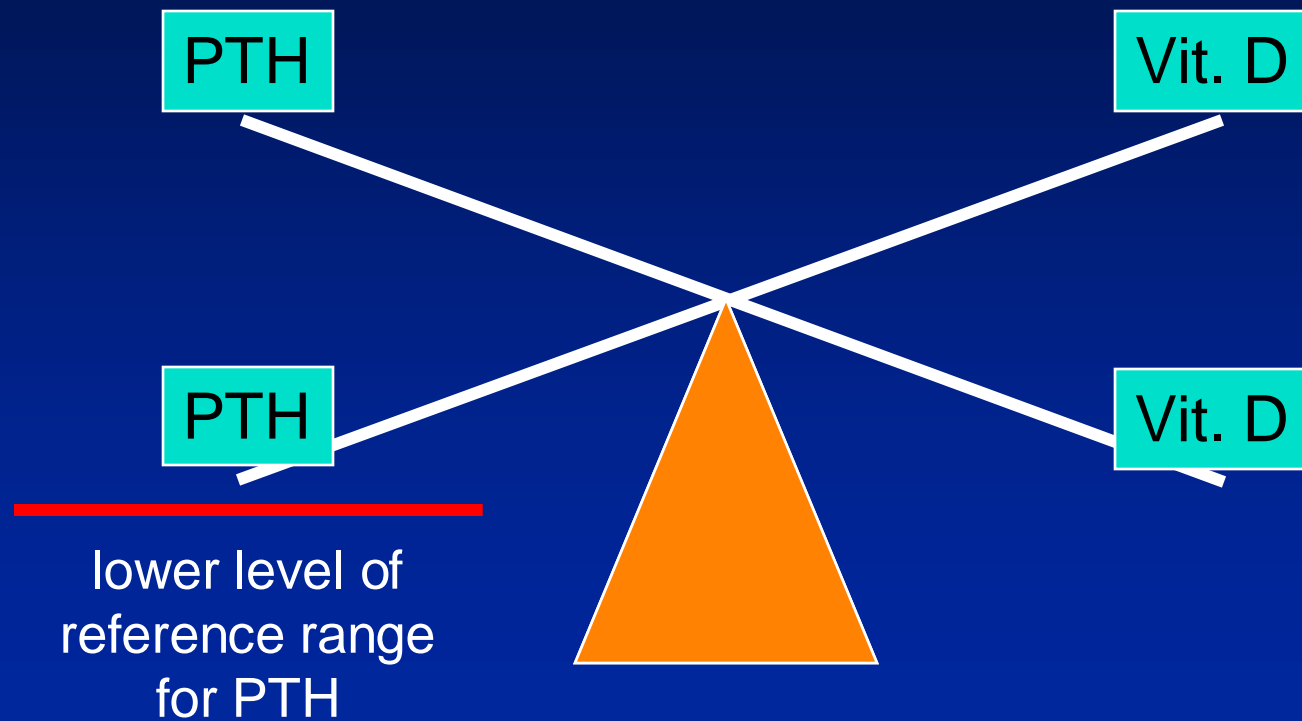
[\[HTML\] Vitamin D suppresses Th17 cytokine production by inducing C/EBP homologous protein \(CHOP\) expression](#)  
[SH Chang, Y Chung, C Dong - Journal of biological chemistry, 2010 - Elsevier](#)  
... At a lower concentration of 1,25D3, **Th17** cells can suppress the production of cytokines ...  
**Th17** cells, this report proposes a novel regulatory pathway of **Th17** cytokines via **vitamin D**. ...  
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[Vitamin D reduces the differentiation and expansion of Th17 cells in young asthmatic children](#)  
[A Hamzaoui, A Berraïes, B Hamdi, W Kaabachi... - Immunobiology, 2014 - Elsevier](#)  
... **Vitamin D** inhibits the molecules associated with **Th17** cell effector function. Naive CD4 + T cells from BD patients (n = 10) were cultured under **Th17** polarizing conditions with 25(OH)...  
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# Metabolism of vitamin D within the cells of parathyroid glands



How can we adjust the daily dose according to the individual level of genetic resistance to vitamin D?



PTH inhibition is the most valuable index to adjust daily doses of vitamin D

- shows the level of individual resistance;
- if not suppressed, assures safety.

# Systemic Lupus Erythematosus



# Systemic Lupus Erythematosus - 2





# Systemic Lupus Erythematosus -3



# psoriasis - 1



# psoriasis - 2





# psoriasis - 3



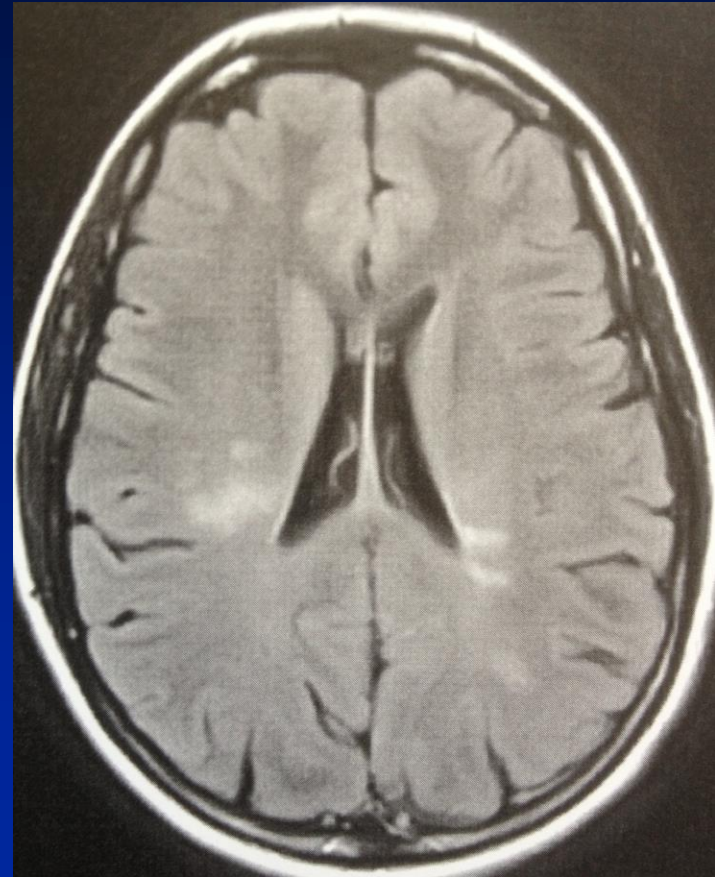
# effects on multiple sclerosis – 1

## remyelination of recent lesions

NRF, female, dob 03/21/1982



MRI (Flair Scan) March 14, 2011

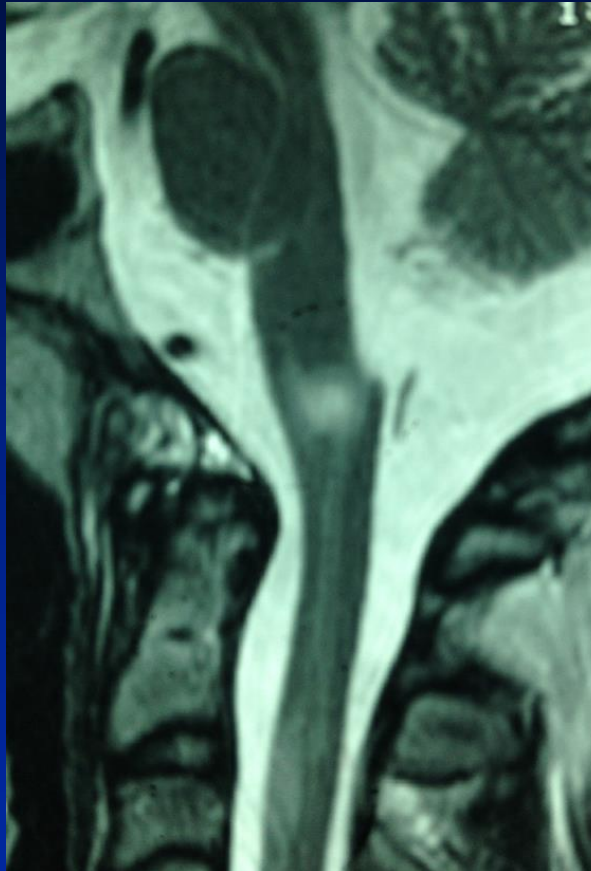


MRI (Flair Scan) July 23, 2012



# effects on multiple sclerosis – 2

JHCDN, male, dob 10/02/1989



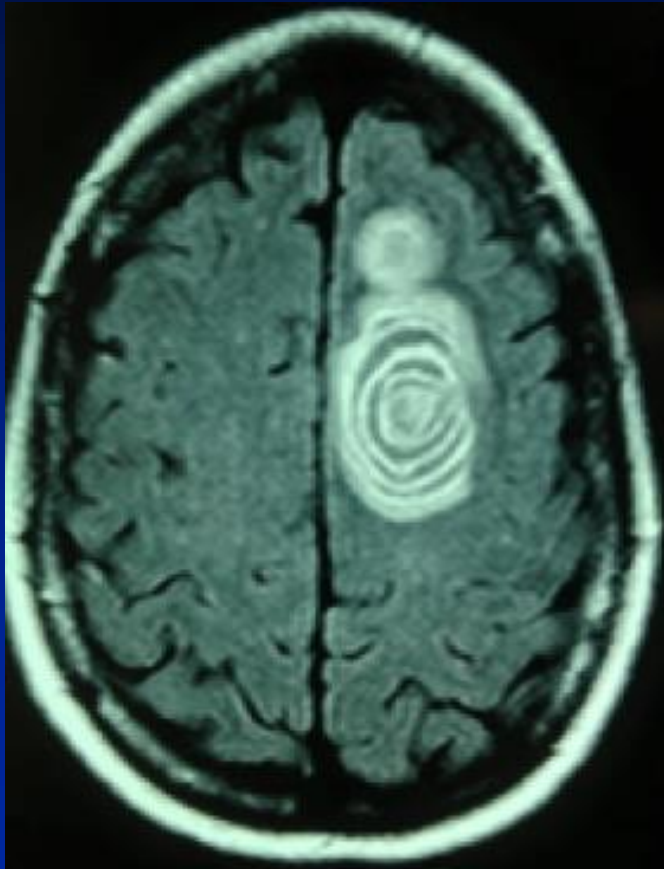
MRI (T2) April 18, 2011



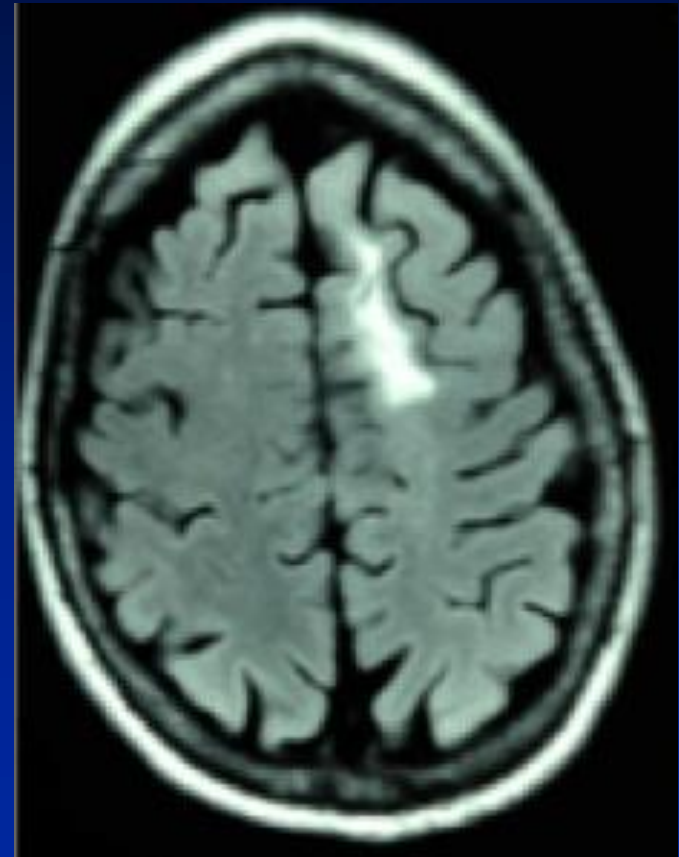
MRI (T2) September 18, 2013

# effects on Balo's concentric sclerosis – a severe disease related to multiple sclerosis

IMFF, female, dob 07/10/1952



MRI (flair) October, 2008



MRI (flair) January, 2013

↑cholecalciferol

Liver

no effect 25-hydroxylase

↑ 25(OH)D3

Kidney

1α-hydroxylase

1α,25(OH)<sub>2</sub>D3

intestine  
and  
bone

blood serum

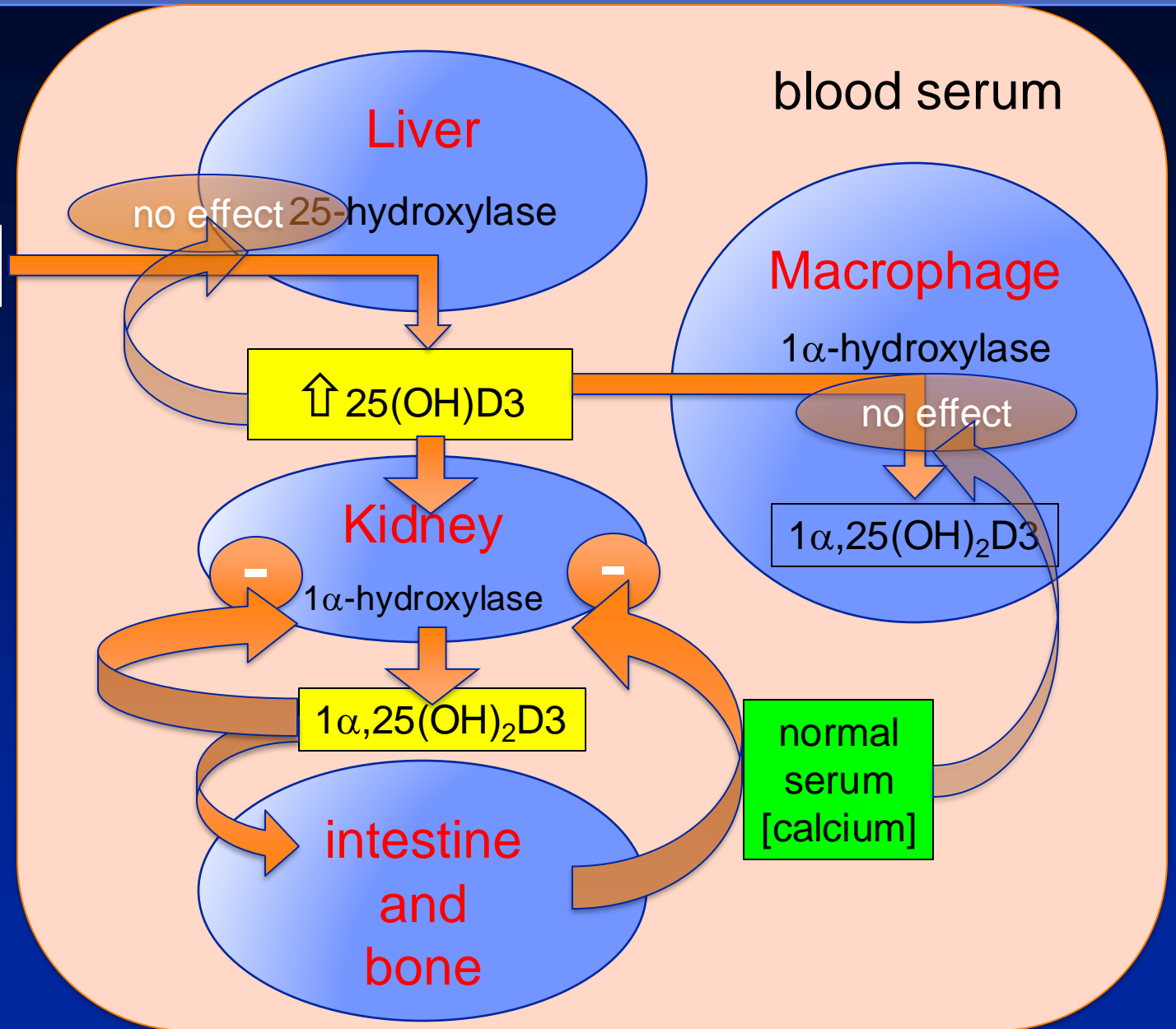
Macrophage

1α-hydroxylase

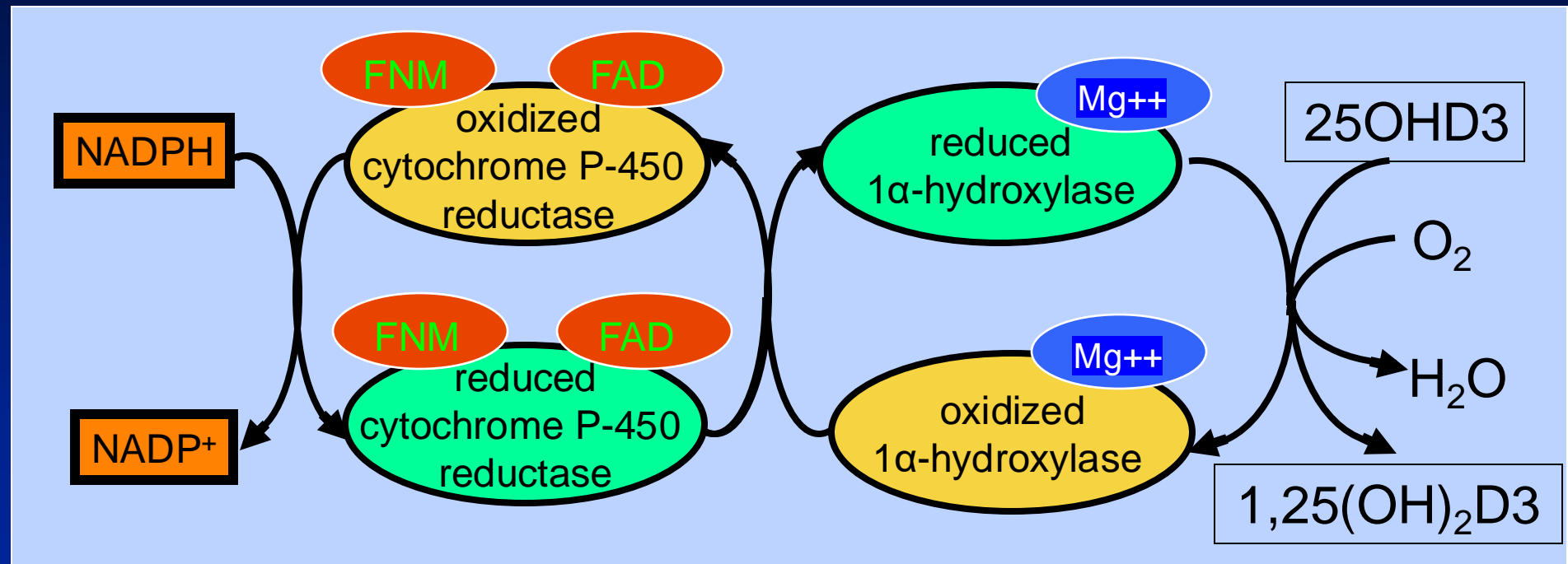
no effect

1α,25(OH)<sub>2</sub>D3

normal  
serum  
[calcium]

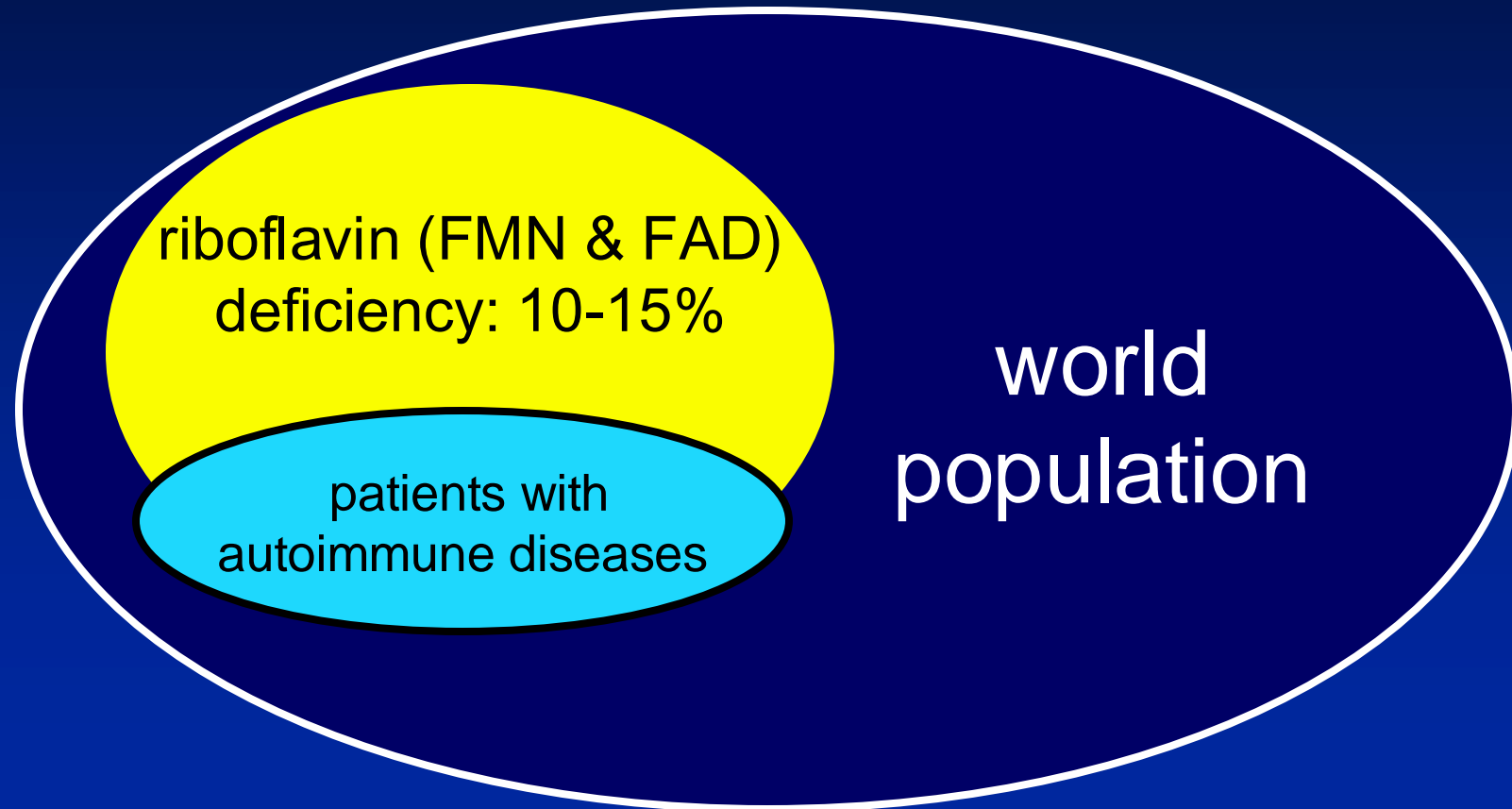


Vitamin D 1 $\alpha$ -hydroxylase belongs to the cytochrome P-450 superfamily; therefore, 1 $\alpha$ -hydroxylase activity depends on the availability of vitamin B2 and magnesium



Both FMN and FAD are prosthetic groups of the reductase of cytochrome P-450 enzyme family → both are essential for 1 $\alpha$ -hydroxylase activity

Deficient absorption of riboflavin  
(vitamin B2 – FMN and FAD precursor):  
what is the possible relationship with autoimmunity?



**Endemic malaria from 300 B.C. increased the  
prevalence of impaired riboflavin absorption in some  
areas of Italy  
(from 10-15% to 50%)**

*Am. J. Hum. Genet.* 55:975-980, 1994

**Is the Flavin-deficient Red Blood Cell Common in Maremma, Italy,  
an Important Defense against Malaria in This Area?**

Barbara B. Anderson,<sup>1</sup> Massimo Scattoni,<sup>3</sup> Gillian M. Perry,<sup>4</sup> Paola Galvan,<sup>5</sup> Mirella Giuberti,<sup>2</sup>  
Giuseppe Buonocore,<sup>6</sup> and Calogero Vullo<sup>1</sup>

<sup>1</sup>Divisione Pediatrica, Arcispedale S. Anna, and <sup>2</sup>Istituto Professionale Alberghiero, Ferrara; <sup>3</sup>Divisione Pediatria, Ospedale Generale, Grosseto, Italy;  
<sup>4</sup>Haematology Department, St. Bartholomew's Hospital, London; <sup>5</sup>Dipartimento di Pediatria, Ospedale Meyer, Florence;  
and <sup>6</sup>Cattedra di Neonatologia, Università di Siena, Siena





High doses of cholecalciferol should be taken only under the supervision of an experienced physician to avoid harming renal function

# Causes of intoxication (increased serum calcium levels:

- ❑ unreliable source of vitamin D (doses higher than prescribed)
- ❑ urinary tract infections (particularly pyelonephritis)
- ❑ poor compliance with dietary calcium restriction
- ❑ hyperthyroidism (Basedow-Graves disease)
- ❑ concomitant administration of supplements containing vitamin C (systemic oxalosis)
- ❑ concomitant administration of drugs such as lithium and aromatase inhibitors

**Intoxication: patients should be aware of symptoms such as persistent nausea and constipation, and should**

- ❑ Stop taking vitamin D and all other supplements except for magnesium;
- ❑ Increase daily hydration to  $\geq 3,5\text{L}$  per day;
- ❑ Double the daily dose of 100 mg of elemental magnesium to 2 doses 4 times per day (QID);
- ❑ Start furosemide 40 mg 1 tablet twice a day (BID) for one week and then reduce to once a day;
- ❑ Start potassium 100 mg 1 tablet twice a day (BID) for one week and then reduce to once a day;
- ❑ Alendronate 70 mg every other day for 3 doses consecutive doses and then reduce to once a day;
- ❑ Collect blood and urine samples as prescribed (repeat after one week) and send the results to be evaluated.

# Intoxication (nausea, no bowel movements for several days)

- Parathormone
- \*Total and ionized calcium
- \*Urea (BUN) and creatinine
- \*Sodium and potassium
- \*Urinary calcium (24-hour urine sample)
- TSH
- Culture of urine with assessment of sensitivity to antibiotics

*“The IOM recommendations for vitamin D fail in a major way on logic, on science, and on effective public health guidance.”*

PERSPECTIVE

---

**JBMR**

## **Why the IOM Recommendations for Vitamin D Are Deficient**

Robert P Heaney<sup>1</sup> and Michael F Holick<sup>2</sup>

<sup>1</sup>Creighton University , Omaha, NE, USA

<sup>2</sup>Department of Medicine, Division of Endocrinology, Boston University Medical Center, Boston, MA, USA

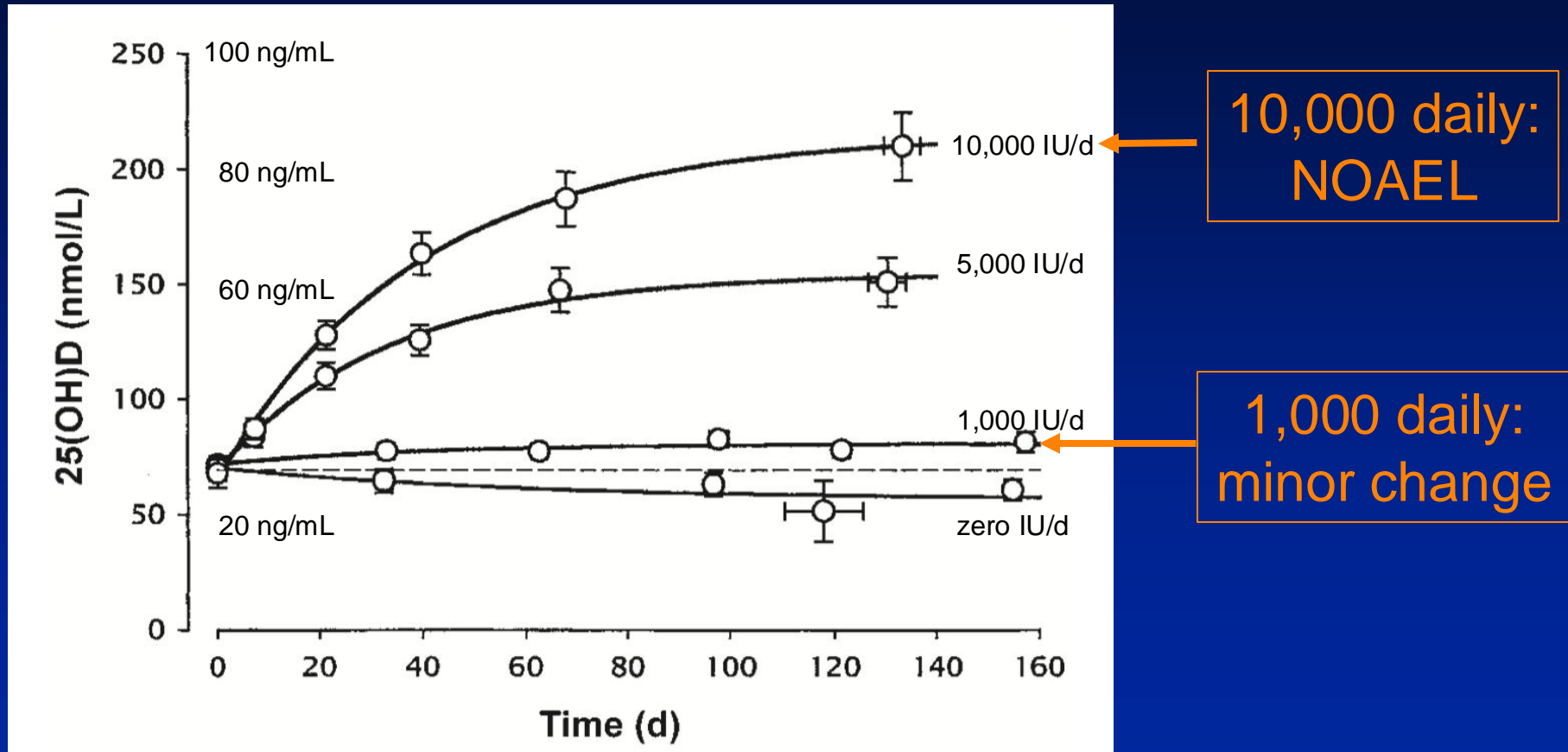
### **ABSTRACT**

The IOM recommendations for vitamin D fail in a major way on logic, on science, and on effective public health guidance. Moreover, by failing to use a physiological referent, the IOM approach constitutes precisely the wrong model for development of nutritional policy.

© 2011 American Society for Bone and Mineral Research.

J Bone Miner Res. 2011 Mar;26(3):455-7

The Institute of Medicine (IOM) recommends 600 IU of vitamin D per day for people up to age 70, and 800 IU per day for people 71 and older.

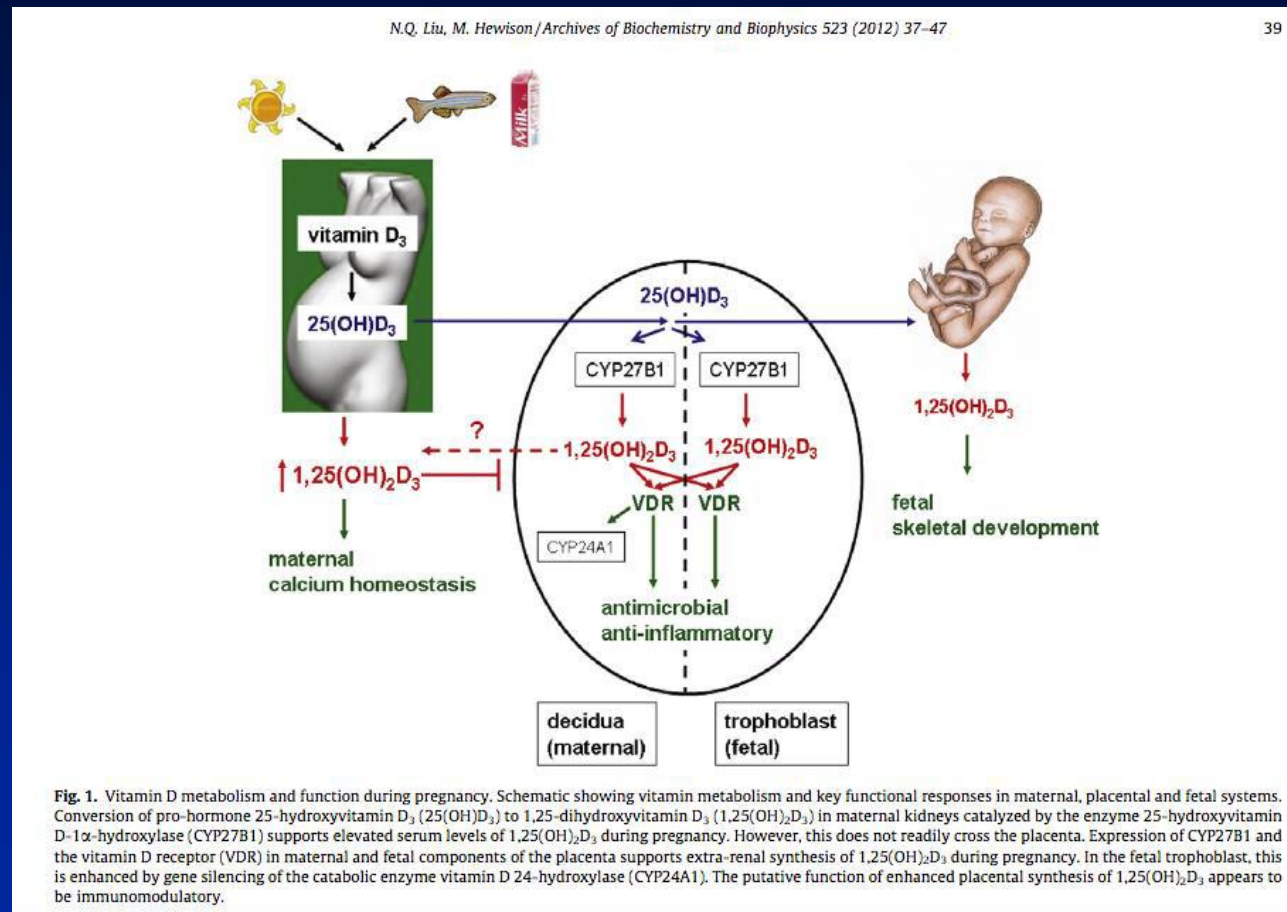


<https://academic.oup.com/ajcn/article/77/1/204/4689654>



# The importance of vitamin D in pregnancy

# Vitamin D is activated by placental cells and plays fundamental roles in placental functions



# Effects of vitamin D status on maternal and fetal health (including childhood)

**Table 1**

Vitamin D and pregnancy: effects of vitamin D status and/or intake on maternal and fetal health.

Clinical problem	Reference
<i>Maternal</i>	
Preeclampsia	[194,197–201,237,238]
Bacterial vaginosis	[23,186,239]
Gestational diabetes	[18,240–242]
Preterm birth	[184,243,244]
<i>Fetal/neonatal</i>	
Small for gestational age	[245,246]
Fetal skeleton/bone	[247]
Neonatal bone mass	[216,248–250]
Childhood bone mass	[115,251]
Asthma	[218,235,252–255]
Type 1 diabetes	[230,231]
Multiple sclerosis	[232]
Autism	[256]
Maternal–fetal HIV transfer	[190]

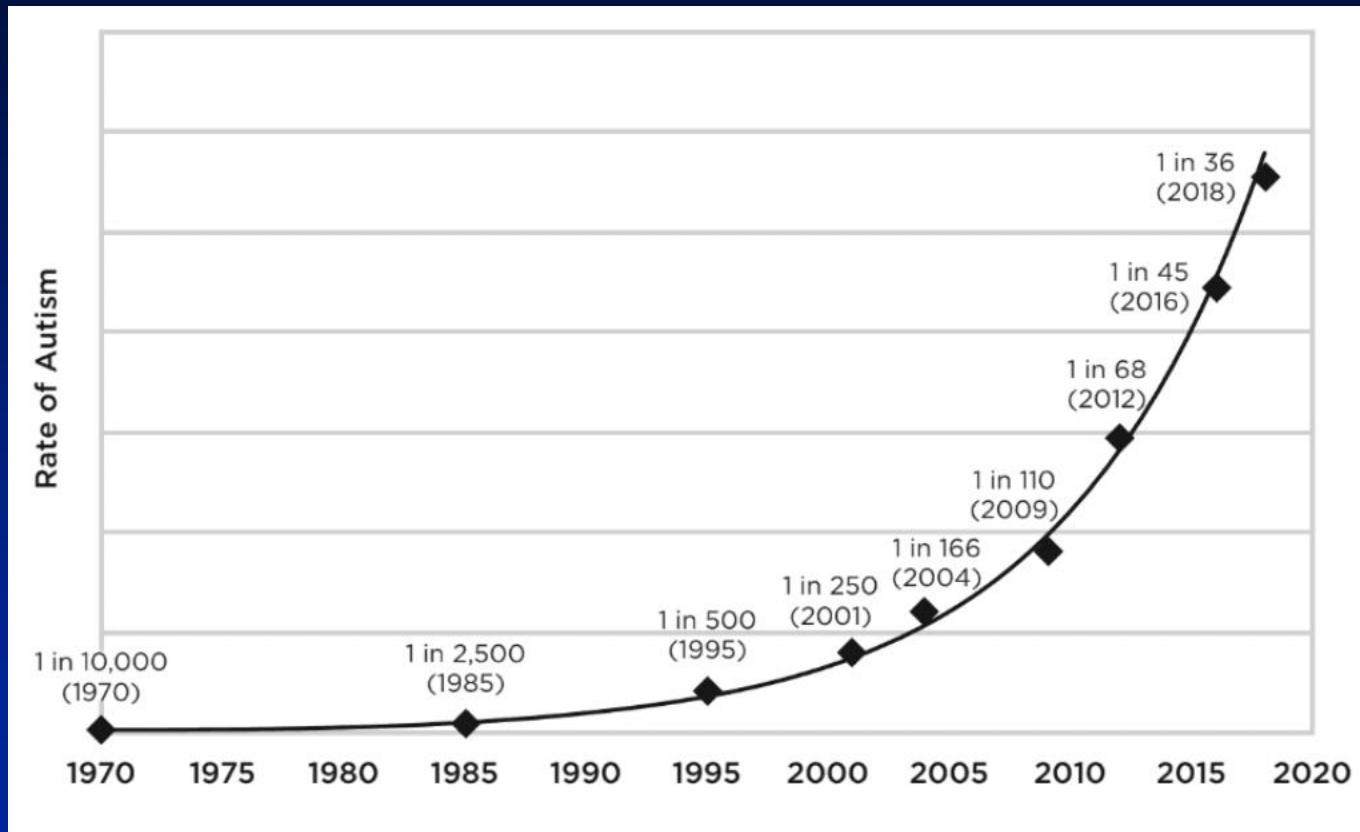
# Pregnancy – Google Scholar (2025) – “vitamin D”:

- ❑ **& fertility:** 71,400 papers
- ❑ **& pregnancy:** 60,500 papers
- ❑ **& preeclampsia:** 27,000 papers
- ❑ **& premature birth:** 56,600 results
- ❑ **& fetal growth restriction:** 50,300 papers
- ❑ **& placental function:** 49,600 papers
- ❑ **& fetal brain development:** 131,000 papers
- ❑ **& fetal wellbeing:** 18,400 papers
- ❑ **& neonatal jaundice:** 18,200 papers
- ❑ **& neonatal sepsis:** 34,700 papers
- ❑ **& neonatal lung maturation:** 29,200 papers
- ❑ **& birth weight:** 193,000 papers



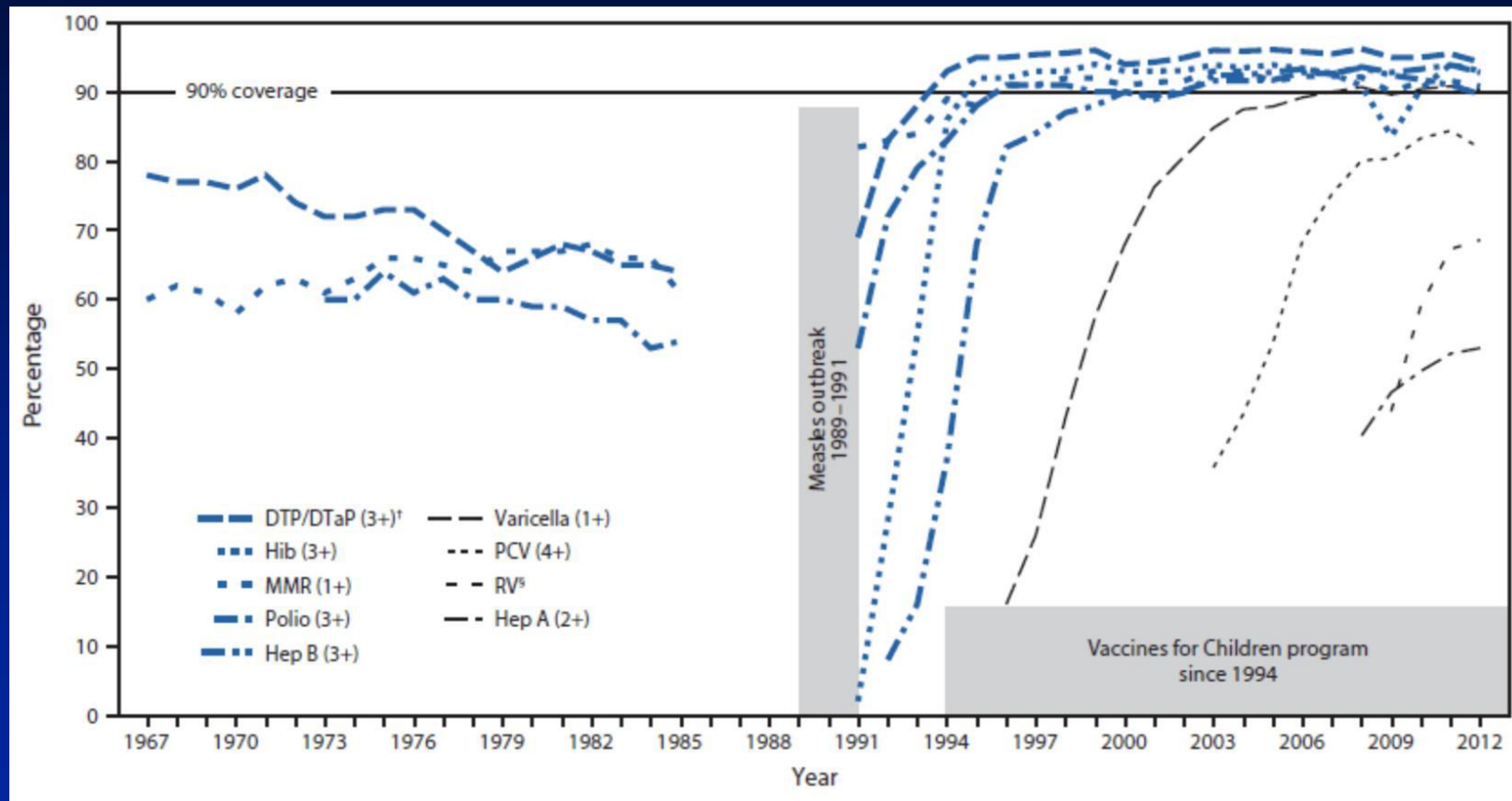
What is the root cause of the explosive rise in autism (ASD)?

# Explosion of Autism





Vaccines for Children (VFF). As taxas de imunização para todas as crianças em idade pré-escolar aumentaram para pelo menos 90% para a maioria das vacinas na década de 1990




[https://en.wikipedia.org/wiki/Vaccines\\_for\\_Children\\_Program](https://en.wikipedia.org/wiki/Vaccines_for_Children_Program)

## Several different adjuvants are used in U.S. vaccines.

Adjuvant	Composition	Vaccines
<a href="#">Aluminum</a>	One or more of the following: amorphous aluminum hydroxyphosphate sulfate (AAHS), aluminum hydroxide, aluminum phosphate, potassium aluminum sulfate (Alum)	Anthrax, DT, DTaP (Daptacel), DTaP (Infanrix), DTaP-IPV (Kinrix), DTaP-IPV (Quadacel), DTaP-HepB-IPV (Pediatrix), DTaP -IPV/Hib (Pentacel), Hep A (Havrix), Hep A (Vaqta), Hep B (Engerix-B), Hep B (Recombivax), HepA/Hep B (Twinrix), HIB (PedvaxHIB), HPV (Gardasil 9), Japanese encephalitis (Ixiaro), MenB (Bexsero, Trumenba), Pneumococcal (Prevnar 13), Td (Tenivac), Td (Mass Biologics), Tdap (Adacel), Tdap (Boostrix)
<a href="#">AS04</a>	Monophosphoryl lipid A (MPL) + <a href="#">aluminum salt</a>	<a href="#">Cervarix</a>
<a href="#">MF59</a>	Oil in water emulsion composed of squalene	Fluad
<a href="#">AS01<sub>B</sub></a>	Monophosphoryl lipid A (MPL) and QS-21, a natural compound extracted from the Chilean soapbark tree, combined in a liposomal formulation	Shingrix
<a href="#">CpG 1018</a>	Cytosine phosphoguanine (CpG), a synthetic form of DNA that mimics bacterial and viral genetic material	Heplisav-B
No adjuvant		ActHIB, chickenpox, live zoster (Zostavax), measles, mumps & rubella (MMR), meningococcal (Menactra, Menveo), rotavirus, seasonal influenza (except Fluad), single antigen polio (IPOL), yellow fever

<https://www.cdc.gov/vaccinesafety/concerns/adjuvants.html>

# Google Scholar (2025): aluminum & toxicity → 2,030,000 papers



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☒ include citations

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**Molecular aspects of aluminum toxicity**

A Haug, CE Foy - Critical Reviews in Plant Sciences, 1984 - Taylor & Francis

... Today **aluminum toxicity** is recognized as a serious global ... soil acidity which mobilizes soil **aluminum**. Recent estimates ... plants are subject to **aluminum toxicity**. Moreover, plants grown ...

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**Aluminum toxicity and tolerance in plants**

E Delhaize, PR Ryan - Plant physiology, 1995 - pmc.ncbi.nlm.nih.gov

... A1 **toxicity** has been identified as a problem of acid soils for over 70 years, our knowledge about the primary sites of **toxicity** ... of A1 **toxicity** and the mechanisms of A1 tolerance in plants. ...

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**Aspects of aluminum toxicity**

CD Hewitt, J Savory, MR Wills - Clinics in laboratory medicine, 1990 - Elsevier

... role of **aluminum** as a **toxic** metal over 50 years ago, but was dismissed as a **toxic** agent as ... **Aluminum** has also been implicated as a **toxic** agent in the etiology of Alzheimer's disease, ...

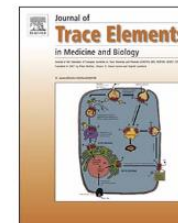
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## Journal of Trace Elements in Medicine and Biology

journal homepage: [www.elsevier.com/locate/jtemb](http://www.elsevier.com/locate/jtemb)



### Aluminium in brain tissue in autism

Matthew Mold<sup>a</sup>, Dorcas Umar<sup>b</sup>, Andrew King<sup>c</sup>, Christopher Exley<sup>a,\*</sup>

<sup>a</sup> The Birchall Centre, Lennard-Jones Laboratories, Keele University, Staffordshire, ST5 5BG, United Kingdom

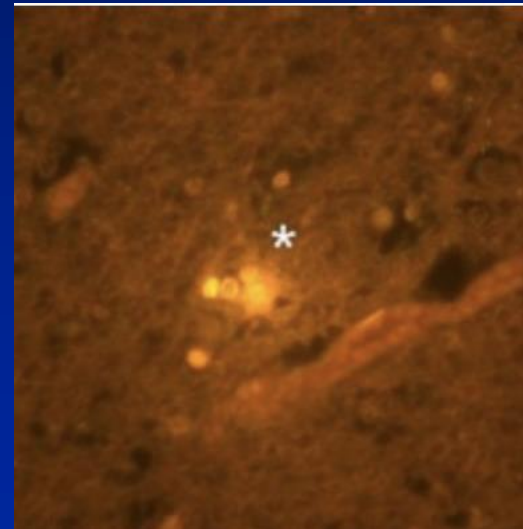
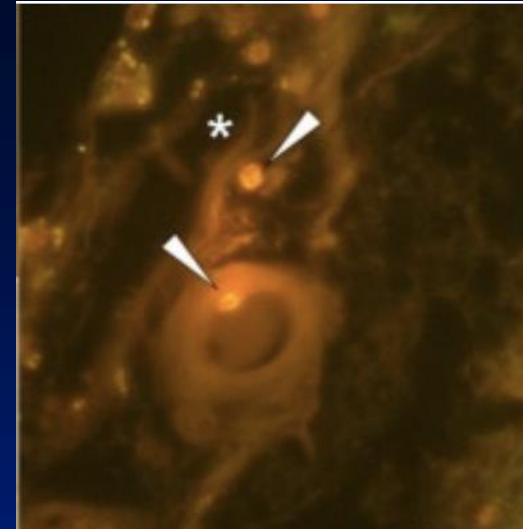
<sup>b</sup> Life Sciences, Keele University, Staffordshire, ST5 5BG, United Kingdom

<sup>c</sup> Department of Clinical Neuropathology, Kings College Hospital, London, SE5 9RS, United Kingdom



<https://www.sciencedirect.com/science/article/pii/S0946672X17308763>

*“...the fact that we found aluminium in every sample of brain tissue, frozen or fixed, does suggest very strongly that individuals with a diagnosis of ASD have extraordinarily high levels of aluminium in their brain tissue and that this aluminium is pre-eminently associated with non-neuronal cells including microglia and other inflammatory monocytes..”*





*“Brain translocation of alum particles is linked to a Trojan horse mechanism previously described for infectious particles (HIV, HCV), that obeys to CCL2, signaling the major inflammatory monocyte chemoattractant.”*



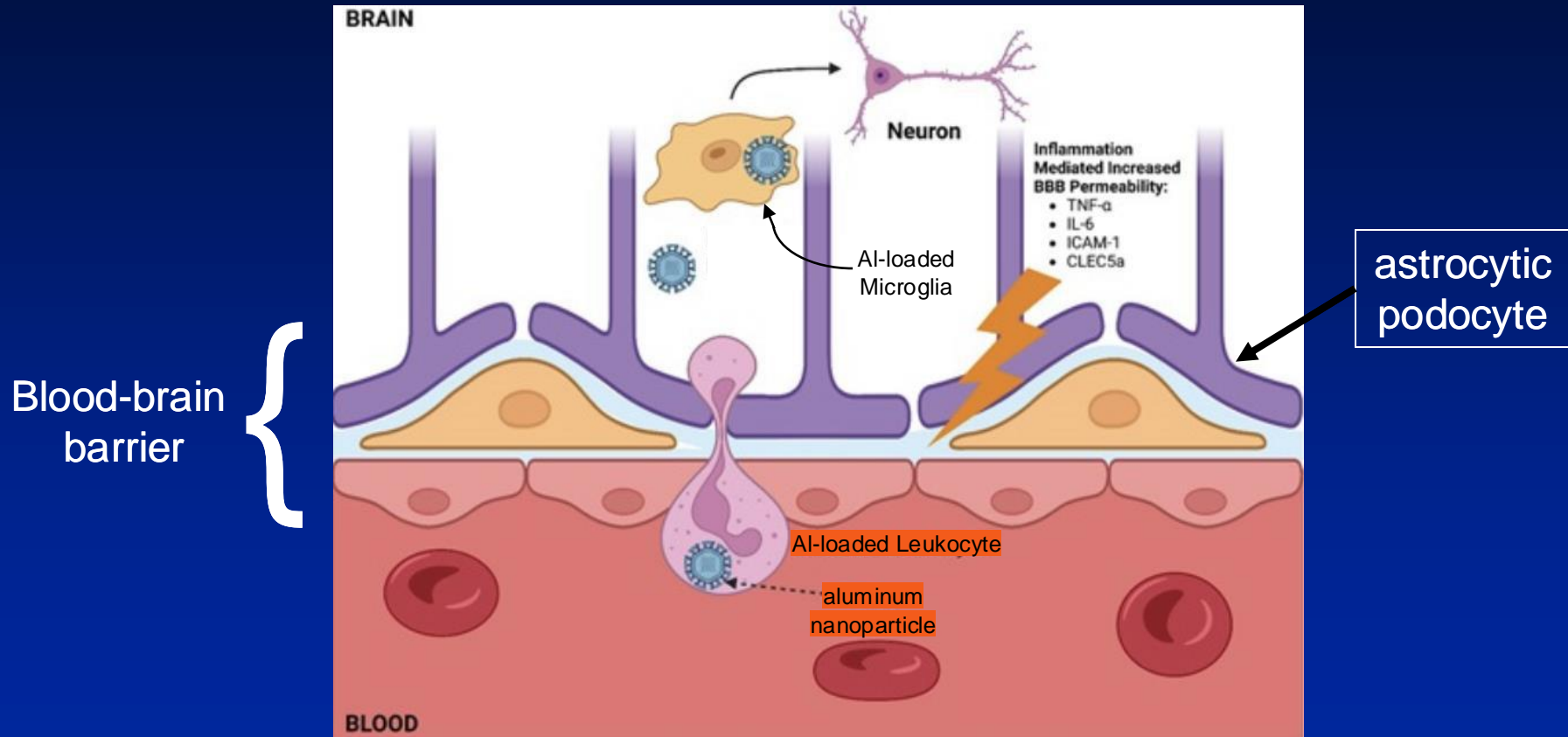
## Biopersistence and brain translocation of aluminum adjuvants of vaccines

**Romain Kroum Gherardi \*, Housam Eidi, Guillemette Crépeaux, François Jerome Authier and Josette Cadusseau**

*Faculté de Médecine and Faculté des Sciences et Technologie, INSERM U955 Team 10, Université Paris Est-Créteil, Créteil, France*

Gherardi RK et al. Biopersistence and brain translocation of aluminum adjuvants of vaccines. Front Neurol. 2015 Feb 5;6:4.

**The Trojan horse mechanism:** when vitamin D levels are low, loaded leukocytes transport aluminum nanoparticles across the blood-brain barrier and the placental barriers within immune cells, infecting the brain and the fetus.



Modified from *Seminars in Medical & Surgical Oncology* 35(6): 276-276, June 2023

# Why are aluminum nanoparticles used in vaccines?

- aluminum causes inflammation, attracting immune cells to the injection site;
- aluminum nanoparticles containing antigens adsorbed to their surfaces are phagocytized (“engulfed”) by leucocytes, thereby triggering antibody synthesis → this is called “adjuvant effect of nanoparticles”;

# Aluminum nanoparticles cause inflammation of the brain tissue

- The chronic encephalitis associated with ASD can be demonstrated by measuring the circulating levels of Neuron-Specific Enolase (NSE); Brain inflammation disrupts the blood-brain barrier, leading to increased permeability of the BBB to toxins and microbes;
- The adjuvant effect of aluminum nanoparticles induces autoantibody synthesis against brain tissue.

*“We have found that the neuron-specific enolase (NSE) was elevated above the normal clinical range (less than 16.3 ng/mL) in the vast majority of ASD kids tested in our study (40 of 41, or 97.5%).”*

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## Neuron-Specific Enolase (NSE) as a Biomarker for Autistic Spectrum Disease (ASD)

by Felician Stancioiu <sup>1</sup> , Raluca Bogdan <sup>2</sup> and Radu Dumitrescu <sup>2,\*</sup> 

<sup>1</sup> Fundatia Bio-Forum, 040245 Bucharest, Romania

<sup>2</sup> Medicover Hospital Bucharest, 013982 Bucharest, Romania

\* Author to whom correspondence should be addressed.

*Life* **2023**, *13*(8), 1736; <https://doi.org/10.3390/life13081736>

Submission received: 23 June 2023 / Revised: 10 August 2023 / Accepted: 11 August 2023 / Published: 13 August 2023

(This article belongs to the Special Issue **Physiology and Pathology: Feature Review Papers**)

Life (Basel). 2023 Aug 13;13(8):1736.

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Life (Basel). 2023 Aug 13;13(8):1736.



# Google Scholar (2025): autism & autoantibodies & brain → 12,600 papers



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**Brain autoantibodies in autism spectrum disorder**  
NE Elamin, [LY Al-Ayadhi](#) - Biomarkers in medicine, 2014 - Taylor & Francis  
... contacts of **autistic** children, anti-**brain** IgG **autoantibodies** were present in sera from healthy individuals and clinically depressed patients, and IgG **autoantibodies** to endothelial cells are ...  
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**Autoimmunity, autoantibodies, and autism spectrum disorder**  
E Edmiston, P Ashwood, [J Van de Water](#) - Biological psychiatry, 2017 - Elsevier  
Autoimmunity, **Autoantibodies**, and **Autism** Spectrum Disorder - ScienceDirect ...  
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**Brain-specific autoantibodies in the plasma of subjects with autistic spectrum disorder**  
M Cabanlit, S Wills, P Goines... - Annals of the New ..., 2007 - Wiley Online Library  
... from subjects with **autism** for the presence of **autoantibodies** to human adult **brain** extracts by ... a significantly higher frequency of **brain-specific autoantibodies** occurring in children with ...  
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*“Multiple brain-specific autoantibodies are present at significantly higher frequency in children with autism”*

## **Brain-Specific Autoantibodies in the Plasma of Subjects with Autistic Spectrum Disorder**

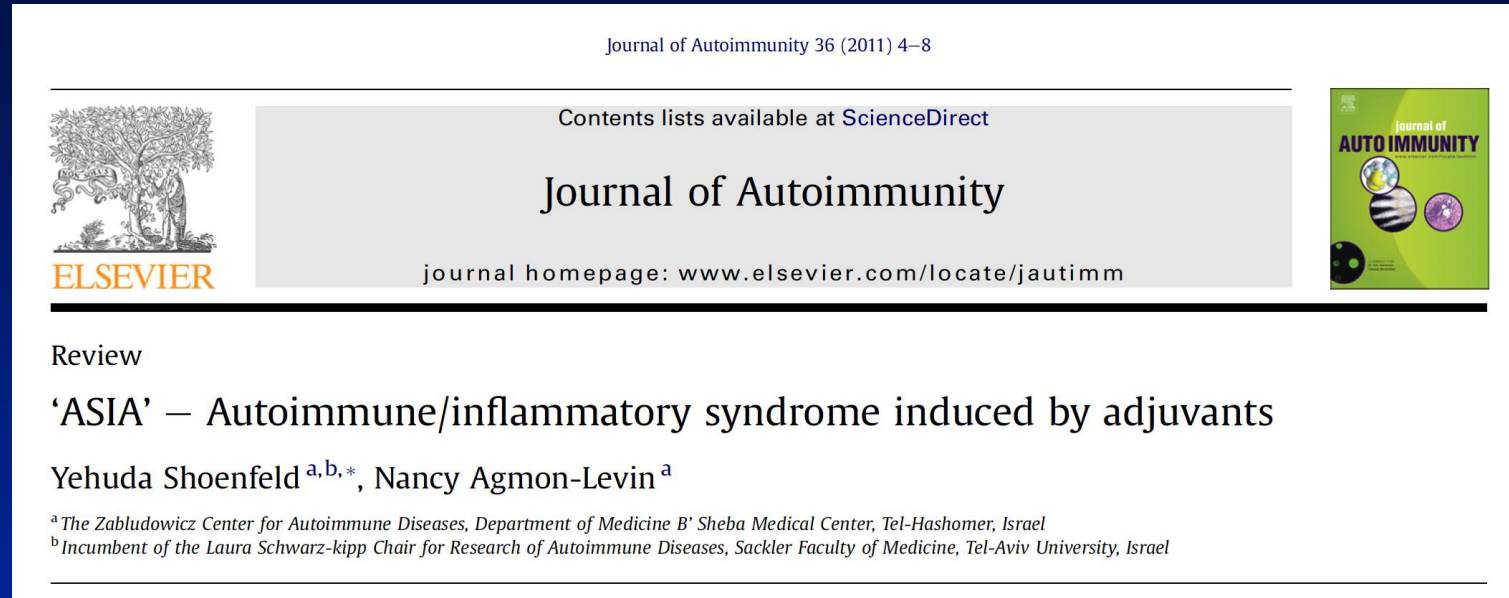
MARICEL CABANLIT,<sup>a</sup> SHARIFIA WILLS,<sup>a</sup> PAULA GOINES,<sup>a</sup>  
PAUL ASHWOOD,<sup>b</sup> AND JUDY VAN DE WATER<sup>a</sup>

*<sup>a</sup>Division of Rheumatology, Allergy and Clinical Immunology, University of California, Davis, California, USA*

*<sup>b</sup>Department of Microbiology, and the MIND Institute, University of California, Davis, California, USA*

Ann N Y Acad Sci. 2007 Jun;1107:92-103

# ASD fulfills the criteria to be classified as an Autoimmune/Inflammatory Syndrome Induced by Adjuvants (ASIA) reported by Shoenfeld and Agmon-Levin in 2011



*“...factors entailing an immune adjuvant activity such as **infectious agents**, **silicone**, **aluminium salts** and others were associated with defined and non-defined immune mediated diseases...”*

J Autoimmun. 2011 Feb;36(1):4-8

# Autism as an autoimmune disorder

AL-Ayadhi and Mostafa *Journal of Neuroinflammation* 2012, **9**:158  
<http://www.jneuroinflammation.com/content/9/1/158>



JOURNAL OF  
NEUROINFLAMMATION

RESEARCH

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## Elevated serum levels of interleukin-17A in children with autism

Laila Yousef AL-Ayadhi<sup>1</sup> and Gehan Ahmed Mostafa<sup>1,2,3\*</sup>

*“Children with autism had significantly higher serum IL-17A levels than healthy controls ( $P < 0.001$ )...”*

*“Serum IL-17A levels were raised in the group with autism, and the levels correlated significantly with the severity of autism.”*

# Google Scholar (2025): Vitamin D & autism → 27,700 papers



autism "vitamin D"

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**Vitamin D and autism, what's new?**  
JJ Cannell - *Reviews in Endocrine and Metabolic Disorders*, 2017 - Springer  
... treating **autism** with 300 IU/kg/day, and seek to prevent **autism** by ... As the American Academy of Pediatrics recommends **vitamin D** ... evidence on **autism** and **vitamin D** and act accordingly. ...  
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**Vitamin D and autism: clinical review**  
[E Kočovská](#), [E Fernell](#), [E Billstedt](#), [H Minnis](#)... - *Research in ...*, 2012 - Elsevier  
... , mothers of children with **autism** had the lowest levels of **vitamin D**. The differences between ... a child with **autism** were not statistically significant, but those with a child with **autism** had ...  
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**Autism and vitamin D**  
JJ Cannell - *Medical hypotheses*, 2008 - Elsevier  
... to **autism**, but afflicted children have hypotonia, decreased activity, developmental motor delay, listlessness, failure to thrive, and other **autistic** markers similar to common **vitamin D** ...  
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Aaron Siri (LinkedIn): "We created the below image to help visualize the CDC's vaccine schedule (and only until 12 months of age) pre-1986 Act (which gave pharma companies immunity for vaccine injuries) and today.

## CDC IMMUNIZATION SCHEDULE IN UTERO TO 12 MONTHS

### 1986



### 2024



Source: <https://www.cdc.gov/vaccines/schedules/hcp/schedule-related-resources.html>



**Table 5**

Comparison of Al exposure from vaccines in children and adults. An infant's vaccine-derived Al exposure of 73.5 µg Al/kg bw is equivalent to that from 10 HB vaccines given in a single day to a 70 kg adult  $((73.5 \text{ µg Al/kg bw} \times 70 \text{ kg})/(\text{HB dose (500 µg Al)}) = 5147/500 = 10.3)$ . The vaccine-derived Al exposure in a 2 month old receiving 172.5 µg Al/kg bw is equivalent to that from 24 HB vaccines given in a single day to a 70 kg adult  $((172.5 \text{ µg Al/kg bw} \times 70 \text{ kg})/(\text{HB vaccine dose (500 µg Al)}) = 12075/500 = 24.2)$ .

	An adult receiving a single HB vaccine (adult dose)	An infant receiving a single HB vaccine at birth (pediatric dose)	A 2 month old receiving the recommended set of injections (mean exposure)
Al (µg)	500	250	862.5
Bw (kg)	70	3.4	5
Total Al µg/kg bw	7.1	73.5	172.5

# 2023 → 76 total doses

## CDC Recommended Schedule

**1983**

**11 Shots**

**24 Doses**

**2 Months**

DTP

OPV

**4 Months**

DTP

OPV

**6 Months**

DTP

**15 months**

MMR

**18 months**

DTP

OPV

**4 years**

DTP

OPV

**15 years**

Td

**1986**

**National  
Childhood  
Vaccine  
Injury Act**

**2023**

**58 Shots, 76 Doses**

**Pregnancy**

Influenza

Tdap

**Birth**

Hep B

**2 months**

Hep B

Rotavirus

DTaP

HIB

PCV

IPV

**4 months**

Rotavirus

DTaP

HIB

PCV

IPV

**6 months**

Hep

Rotavirus

DTaP

HIB

PCV

IPV

Influenza

COVID

**7 months**

Influenza

**8 months**

COVID

**10 months**

COVID

**12 months**

HIB

PCV

MMR

Varicella

Hep A

**18 months**

DTaP

Influenza

Hep A

**30 months**

Influenza

**42 months**

Influenza

**4 years**

DTaP

IPV3

MMR

Varicella

**5 years**

Influenza

**6 years**

Influenza

**7 years**

Influenza

**8 years**

Influenza

**9 years**

Influenza

**10 years**

Influenza

HPV

**11 years**

Influenza

HPV

**12 years**

DTaP

Influenza

Meningococcal

**13 years**

Influenza

**14 years**

Influenza

**15 years**

Influenza

**16 years**

Influenza

Meningococcal

**17 years**

Influenza

**18 years**

Influenza

<https://parentsforhealthchoice.com/vaccine-dose-history>

# 2024 → 88 total doses

1962	1983	1986	2024
3 VACCINES, 5 TOTAL DOSES	4 VACCINES, 24 TOTAL DOSES		15 VACCINES, 88 TOTAL DOSES
Polio	DTP (2 months)		Influenza (pregnancy)
Smallpox	OPV (2 months)		Tdap (pregnancy)
DTP	DTP (4 months)		RSV (pregnancy)*
	OPV (4 months)		HepB (birth)
	DTP (6 months)		HepB (1-2 months)
	MMR (15 months)		Rotavirus (2 months)
	DTP (18 months)		DTaP (2 months)
	OPV (18 months)		Hib (2 months)
	DTP (4-6 years)		PCV15 (2 months)
	OPV (4-6 years)		IPV (2 months)
	Td (14-16 years)		HepB (6-18 months)
			Rotavirus (4 months)**
			DTaP (4 months)
			Hib (4 months)**
			PCV15 (4 months)
			IPV (4 months)
			COVID-19 (6 months-4 years)***
			DTaP (6 months)
			PCV15 (6 months)
			IPV (6-18 months)
			Hib booster (12-15 months)
			PCV15 (12-15 months)
			Influenza (6-12 months)****
			MMR (12-15 months)
			Varicella (12-15 months)
			HepA (12-17 months)
			HepA (18-23 months)
			DTaP (15-18 months)
			Influenza (2 years)****
			Influenza (3 years)****
			DTaP (4-6 years)
			IPV (4-6 years)
			MMR (4-6 years)
			Varicella (4-6 years)
			Influenza (4 years)****
			Influenza (5 years)****
			COVID-19 booster (5-11 years)
			Influenza (6 years)****
			Influenza (7 years)****
			Influenza (8 years)****
			Influenza (9 years)
			HPV dose 1 (9-18 years)
			HPV dose 2 (9-18 years)
			Influenza (10 years)
			Influenza (11 years)
			Meningococcal (11-12 years)
			Tdap (11-12 years)
			Influenza (12 years)
			COVID-19 booster (12-18 years)
			Influenza (13 years)
			Influenza (14 years)
			HPV dose 3 (15-18 years)
			Influenza (15 years)
			Influenza (16 years)
			Meningococcal (16 years)
			Influenza (17 years)
			Influenza (18 years)

<https://www.kshf.org>

# Prenatal brain poisoning with aluminum nanoparticles

The flu vaccine, Tdap (tetanus, diphtheria, and pertussis), and respiratory syncytial virus (RSV) contain aluminum nanoparticles that may cross the placental barrier and accumulate in the fetal brain.

A person is sitting on a wooden dock, facing away from the camera and towards a bright sun in a clear blue sky. Their arms are outstretched, with one hand reaching towards the sun and the other pointing towards the horizon. The person is wearing a dark, patterned tank top and light-colored pants. In the background, there is a calm lake and distant mountains.

Good Morning Sunshine!

The Earth Says Hello...