

Vitamin D in Rheumatology Practice

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Disclaimer

• None



Discussion Points

- Vitamin D in Immune System
- Vitamin D in Auto-immune conditions
- Popularity of vitamin D supplementation nowadays



The Immune System

The Immune System





Doan, Thao. II. Series: Lippincott's illustrated reviews. 2013. Lippincott Williams & Wilkins. .





Haemopoietic Lineages

29.08.2020

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Hanmar Rheumatology Botter

T & B Lymphocytes

Doan, Thao. II. Series: Lippincott's illustrated reviews. 2013. Lippincott Williams & Wilkins. .





The Complement Pathway

Mar Lwin Doan, Thao. II. Series: Lippincott's illustrated reviews. 2013. Lippincott Williams & Wilkins. .

Cytokine	Cellular Source ^a	Targets ^a	Function	Receptor
μ-1α				
IL-1β	М, В	T, B, M, End, other	Leukocyte activation, increase endothelium adhesion	CD121a or CD121b
IL-2	т	T, B, NK, M, oligo	T cell proliferation, regulation	CD122/CD25
IL-3	T ^b , Mas, Eos, NK, End	Ery, G	Proliferation and differentiation of hematopoi- etic precursors	CD123/CDw131
IL-4	Mas, T, M	B, T, End	Differentiation of Th2 and B cells	CD124/CD132
IL-5	Mas, T, Eos	Eos, B	Growth differentiation of B cells and eosinophils	CD125/CDw131
IL-6	T, B, M, Astrocytes, End	T, B, others	Hematopoiesis, differentiation, inflammation	CD126/CD130
IL-7	Bone marrow and thymic stroma	pB, pT	Pre/pro-B cell proliferation, T cell, upregulation of pro-inflammatory cytokines	CD127/CD132
IL-8	M, L, others	PMN, Bas, L	Chemoattractant	CD128
IL-9	Th2 ^b	T, B	Potentiates production of IgM, IgG, IgE	
IL-10	CD8 ^b T, Th2, (B) M	T, B, Mas, M	Inhibits IFN-γ, TNF-β, IL-2 by TH1 cells, DTH, stimulates Th2	CD210
IL-11		Bone marrow stroma	Osteoclast formation	
IL-12	DC, B, T	T, NK	Potentiates IFN-g and TNF-a production by T and NK, down-regulates IL-10	CD212
IL-13	Th2 ^b , Mas, NK	Th2, B, M	Th2 modulator, down-regulated IL-1, IL-6, IL-8, IL-10, IL-12	
IL-14	Т	B ^b	Stimulates proliferation, inhibits Ig secretion	
IL-15	M, Epi	T, B ^b	Proliferation	
IL-16	Eos, CD8 ^b T	CD4 ^b T	CD4 ^b chemoattractant	
IL-17	(T)	Epi, End, others	Osteoclastogenesis, angiogenesis	
IL-18	М	Th1, NK	Induces IFN-g production, enhances NK activity	
IL-32	T, NK, Epi	Wide variety	Pro-inflammatory	
TGF-β	Eos, others	Many cell types	Anti-inflammatory, promotes wound healing	
TNF-α	M ^b , PMN, T, B, NK	M, PMN, T, End, others	Mediator of inflammatory reactions	CD120a and CD120b
TNF-β	L	Wide variety	Mediator of inflammatory reactions	CD120a and CD120b
IFN-α	L, Epi, fibroblasts	Wide variety	Upregulates MHC class I, inhibits viral proliferation	
IFN-β	Epi, fibroblasts	Wide variety	Upregulates MHC class I, inhibits viral proliferation	
IFN-γ	CD8 ^{+b} , (CD4 ^{+b}) NK	T, B, M, NK, End	Antiviral, antiparasite, inhibits proliferation, enhances MHC class I and II expression	CD119
M-CSF	L, M, G, End, Epi, others	М	Growth and differentiation of macrophages	CD115
G-CSF	T ^b , M, End	G	Growth and differentiation of granulocytes	
GM-CSF	T, M, End, Mas	PG, pMye	Stimulates growth and differentiation of granulocytes and myeloid lineage cells	CD116
MIF	м	м	Antiapoptotic activity for macrophages, promotes macrophage survival	



The Cytokines

Regulatory Cytokines

Cytokine	Source	Target	Action
IL-2	T cells	T cells	Proliferation and growth
IL-4	Th2 cells NKT cells	B cells	Proliferation and growth, isotype switch to IgG1, IgG3, IgG4, IgE
	Mast cells	Th0 cells	Inhibit maturation along Th1 pathway
IL-10	Th2 cells CD8⁺ T cells	B cells	Isotype switch to IgG1, IgG3
	Macrophages B cells	Th0 cells	Promotes maturation along Th2 pathway and inhibits Th1 pathway maturation
IL-12	Dendritic cells	NK cells	Stimulates production of IFN- γ that in turn drives development of Th0 to Th1
	Macrophages	Th0 cells	Promotes maturation along Th1 pathway and inhibits Th2 pathway maturation
IL-17	CD4 ⁺ T cells (Th17 subset)	Monocytes Neutrophils	Acts as chemoattractant and induces production of proinflamma- tory cytokines
IL-23	Dendritic cells	CD4 cells	Induces differentiation of Th17 cells and production of IL-17
TGF-β	Th2 cells	B cells	Isotype switch to IgA
		Th1 cells	Inhibits activity
IFN-γ	NK cells	Th0 cells	Differentiation into Th1 pathway
	Th1 cells	B cells	Isotype switch to IgG1, IgG3
		Th2 cells	Inhibition of Th2 cells







Overview of Immune System

Doan, Thao. II. Series: Lippincott's illustrated reviews. 2013. Lippincott Williams & Wilkins. .



Effects of Vitamin D on Immune System



Sheumatol





Vitamin D in Immune System

A. Ligand-dependent Activation



B. Ligand-dependent Suppression



C. Ligand-dependent De-repression



D. Ligand-dependent and independent VDR non-transcriptional regulation



https://doi.org/10.1016/j.jaut.2019.03.002



VDR - Vitamin D Receptor RXR - Retinoic X Receptor VDRE - Vitamin D Response Element





Vitamin D in Auto-immune Conditions



Prevention of steroid induced osteoporosis

- Needed in auto-immune conditions
- Axial skeleton and proximal femur mostly affected
- Even low dose steroid > 7.5 mg/day for more than 3 months bone loss in 50% of patients
- Vitamin D 800 1000 IU per day
- Calcium 1000 1500 mg per day



> Osteoporos Int. 2009 Mar;20(3):427-33. doi: 10.1007/s00198-008-0676-1. Epub 2008 Jul 4.

Vitamin D deficiency in patients with active systemic lupus erythematosus

V Z C Borba¹, J G H Vieira, T Kasamatsu, S C Radominski, E I Sato, M Lazaretti-Castro

> Rheumatol Int. 2011 Sep;31(9):1189-94. doi: 10.1007/s00296-010-1442-1. Epub 2010 Mar 30.

Vitamin D may not be a good marker of disease activity in Korean patients with systemic lupus erythematosus

Hyoun-Ah Kim¹, Jun-Mo Sung, Ja-Young Jeon, Jeong-Moon Yoon, Chang-Hee Suh



Vitamin D deficiency in systemic lupus erythematosus: prevalence, predictors and clinical consequences @

G. Ruiz-Irastorza, M. V. Egurbide, N. Olivares, A. Martinez-Berriotxoa, C. Aguirre

Rheumatology, Volume 47, Issue 6, June 2008, Pages 920–923, https://doi.org/10.1093/rheumatology/ken121

Serum concentrations of 25-OH vitamin D in patients with systemic lupus erythematosus (SLE) are inversely related to disease activity: is it time to routinely supplement patients with SLE with vitamin D?



Comment > Lupus. 2011 Mar;20(3):330-1. doi: 10.1177/0961203310378670. Epub 2010 Aug 19.

Vitamin D deficiency in a cohort of patients with systemic lupus erythematous from the South of

Spain

> Arthritis Rheum. 2009 Oct 15;61(10):1387-95. doi: 10.1002/art.24785.

25-hydroxyvitamin D and cardiovascular risk factors in women with systemic lupus erythematosus

> Arthritis Res Ther. 2006;8(2):R48. doi: 10.1186/ar1910. Epub 2006 Feb 20.

Vitamin D receptor gene BsmI polymorphisms in Thai patients with systemic lupus erythematosus

Wilaiporn Sakulpipatsin¹, Oravan Verasertniyom, Kanokrat Nantiruj, Kitti Totemchokchyakarn, Porntawee Lertsrisatit, Suchela Janwityanujit



> Lupus. 2012 Jan;21(1):53-9. doi: 10.1177/0961203311422709. Epub 2011 Oct 17.

Vitamin D receptor gene BsmI polymorphism B allele, but not BB genotype, is associated with systemic lupus erythematosus in a Han Chinese population

X-Y Lu

> Nephron. 2000 May;85(1):86-91. doi: 10.1159/000045635.

Vitamin-D receptor genotype and renal disorder in Japanese patients with systemic lupus erythematosus

Y Ozaki ¹, S Nomura, M Nagahama, C Yoshimura, H Kagawa, S Fukuhara

Vit D Status Department of Rheumatology, Yangon Specialty Hospital, Data from 2019



SLE (N= 80) 26.3 45 28.8

Sufficient Insufficient Deficient



- Low serum concentrations of vitamin D correlated with SLE disease activity
- Inconsistencies regarding such association by some researches
- An association between vitamin D receptor (VDR) gene Bsml polymorphisms and SLE has been reported in certain populations
- Whether the low levels of vitamin D are the result or the cause?
- Nonetheless, the numerous beneficial effects of vitamin D and the high prevalence of vitamin D deficiency in SLE - vitamin D supplementation recommended



Antiphospholipid Antibody Syndrome

> J Immunol. 1994 Aug 1;153(3):1328-32.

Induction of tissue factor-like activity in monocytes by anti-cardiolipin antibodies

A Kornberg 1 > Ann Rheum Dis. 2011 Jan;70(1):145-50. doi: 10.1136/ard.2010.134817. Epub 2010 Oct 27.

Vitamin D: an instrumental factor in the antiphospholipid syndrome by inhibition of tissue factor expression

N Agmon-Levin ¹, M E Cervera, W Miesbach,

> J Thromb Haemost. 2009 Apr;7(4):605-10. doi: 10.1111/j.1538-7836.2009.03312.x.

Does an active sun exposure habit lower the risk of venous thrombotic events? A D-lightful hypothesis

P G Lindqvist ¹, E Epstein, H Olsson



Antiphospholipid Syndrome

- Higher prevalence of vitamin D deficiency compared to matched healthy controls (49.5 vs. 30 %, respectively, p < 0.001).
- Significant inverse correlation between vitamin D levels and thrombotic manifestations (p < 0.05)
- In vitro model of anti-β2GPI-induced endothelial cell activation decrease expression of tissue factor following the addition of the active form of vitamin D
- No data available regarding VDR polymorphisms and APS.

Vit D_MMA_Cho Mar Lwin



Rheumatoid Arthritis

> Arthritis Rheum. 2011 Jul;63(7):1763-9. doi: 10.1002/art.30341.

Is vitamin D in rheumatoid arthritis a magic bullet or a mirage? The need to improve the evidence base prior to calls for supplementation

> Clin Exp Rheumatol. Nov-Dec 2006;24(6):702-4.

Circannual vitamin d serum levels and disease activity in rheumatoid arthritis: Northern versus Southern Europe

Rheumatoid Arthritis 🛛 🙃 Free Access

Illi, S Paolino, B Seriolo

Dietary intake of vitamin D during adolescence and risk of adultonset systemic lupus erythematosus and rheumatoid arthritis

Linda T. Hiraki 🖾, Kassandra L. Munger, Karen H. Costenbader, Elizabeth W. Karlson

First published: 28 June 2012 | https://doi.org/10.1002/acr.21776 | Citations: 26

Rheumatoid Arthritis



Multicenter Study > Arthritis Rheum. 2007 Jul;56(7):2143-9. doi: 10.1002/art.22722.

Association between serum vitamin D metabolite levels and disease activity in patients with early inflammatory polyarthritis

Sanjeev Pat > Mol Med. 2012 Mar 27;18(1):194-200. doi: 10.2119/molmed.2011.00410.

The vitamin D receptor regulates rheumatoid arthritis synovial fibroblast invasion and morphology

Randomized Controlled Trial> Clin Exp Rheumatol. Sep-Oct 2012;30(5):658-64.Epub 2012 Oct 17.

Associations between vitamin D, disease activity, and clinical response to therapy in rheumatoid arthritis

Joshua F Baker ¹, Daniel G Baker, Gary Toedter, Justine Shults, Joan Marie Von Feldt, Mary B Leonard

Vit D Status Department of Rheumatology, Yangon Specialty Hospital, Data from 2019





Rheumatoid Arthritis



- Vitamin D deficiency common 65 %
- VDR polymorphism associated with RA onset and activity
- Inconsistent findings: on relation between Vit D disease activity, incidence, beneficial effect of vit D supplementation on activity
- Murine models of human arthritis, 1,25-dihydroxycholecalciferol inhibits the progression of arthritis
- Nonetheless, treatment of vitamin D deficiency in RA is relevant as deficiency is common in this group of relatively older patients

Systemic Sclerosis

> Rheumatol Int. 2012 Oct;32(10):3143-8. doi: 10.1007/s00296-011-2150-1. Epub 2011 Sep 27.

Bone density in Moroccan women with systemic scleroderma and its relationships with disease-related parameters and vitamin D status

Yousra Ibn Yacoub¹, Bouchra Amine, Assia Laatiris, Fahd Wafki, Fatima Znat, Najia Hajjaj-Hassouni

Significantly Decreased Serum 25-Hydroxyvitamin D Levels in a Large German Systemic Sclerosis Cohort

THILO GAMBICHLER, INES CHROBOK, STEPHAN HÖXTERMANN and ALEXANDER KREUTER

The Journal of Rheumatology November 2011, 38 (11) 2492-2493; DOI: https://doi.org/10.3899/jrheum.110695

Vitamin D deficiency in a cohort of patients with systemic scleroderma from the south of Spain

Raquel Rios Fernández, Concepción Fernández Roldán, Jose Luis Callejas Rubio, Norberto Ortego Centeno

Vit D Vit D





Systemic Sclerosis

> Autoimmun Rev. 2011 Jun;10(8):490-4. doi: 10.1016/j.autrev.2011.02.002. Review Epub 2011 Feb 12.

Serum 25-OH vitamin D concentrations are linked with various clinical aspects in patients with systemic sclerosis: a retrospective cohort study and

review of the literature > J Rheumatol. 2009 Sep;36(9):1924-9. doi: 10.3899/jrheum.081287. Epub 2009 Jul 31.

Vitamin D deficiency and insufficiency in 2 independent cohorts of patients with systemic sclerosis

Alessandra Vacca¹, Catherine Cormier, Martina Piras, Alessandro Mathieu, Andre Kahan, Yannick

> Clin Rheumatol. 2010 Dec;29(12):1419-25. doi: 10.1007/s10067-010-1478-3. Epub 2010 May 9.

Very low levels of vitamin D in systemic sclerosis patients

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Systemic Sclerosis (N= 98)



Systemic Sclerosis



- Reduced vitamin D production in the skin due to fibrosis and thickening and insufficient intake because of gut involvement and malabsorption
- Vitamin D deficiency reported in several studies
- Correlation between vitamin D deficiency and skin thickening (measured by Rodnan's Score), severity of joint pain, immunological status, longer disease duration, lower DCLO, higher pulmonary arterial pressure, and higher inflammatory markers
- Vitamin D supplementation recommended
- The beneficial effects of higher doses of vitamin D -require further studies

Sjogern's Syndrome



> Ann Rheum Dis. 1990 Sep;49(9):682-4. doi: 10.1136/ard.49.9.682.

Abnormal vitamin D3 metabolism in patients with primary Sjögren's syndrome

> J Autoimmun. 2012 Sep;39(3):234-9. doi: 10.1016/j.jaut.2012.05.018. Epub 2012 Jul 24.

Low levels of vitamin-D are associated with
neuropathy and lymphoma among patients with
Sjögren's syndrome

Advance Access publication 27 November 2009

Concise report

The immunoregulatory role of vitamins A, D and E in patients with primary Sjögren's syndrome

Sjogern's Syndrome



- Vitamin D level in SS -similar to healthy subject
- Association with certain systemic manifestations of disease is uncertain
- lower levels of vitamin D correlated with the presence of peripheral neuropathy and lymphoma

J Autoimmun 39(3):234–239 Rheumatol (Oxford) 49(2):211–217



Undifferentiated Connective Tissue Disease

Vitamin D or hormone D deficiency in autoimmune rheumatic diseases, including undifferentiated connective tissue disease

Maurizio Cutolo

PMID: 19090978 PMCID: PMC2656237 DOI: 10.1186/ar2552

Free PMC a > Arthritis Res Ther. 2008;10(5):R123. doi: 10.1186/ar2533. Epub 2008 Oct 18.

Vitamin D deficiency in undifferentiated connective tissue disease

Eva Zold¹, Peter Szodoray, Janos Gaal, János Kappelmayer, Laszlo Csathy, Edit Gyimesi, Margit Zeher, Gyula Szegedi, Edit Bodolay



Undifferentiated Connective Tissue Disease

- An early stage of all systemic autoimmune diseases
- Eventually 30-40 % evolve defined autoimmune disease SLE, RA, mixed connective tissue disease (MCTD), Systemic Sclerosis
- Who progress into a full blown defined connective tissue disease have lower vitamin D levels than those who remain in the undifferentiated connective tissue disease stage



Mixed Connective Tissue Disease

- A high prevalence of vitamin D insufficiency
- Low vitamin D levels inversely related to the rise of inflammatory cytokines

> Autoimmun Rev. 2011 Apr;10(6):317-24. doi: 10.1016/j.autrev.2010.11.006. Epub 2010 Dec 13.

Vitamin D insufficiency in a large MCTD population

Agota Hajas ¹, Janos Sandor, Laszlo Csathy, Istvan Csipo, Sandor Barath, Gyorgy Paragh, Ildiko Seres, Gyula Szegedi, Yehuda Shoenfeld, Edit Bodolay

Inflammatory Myopathies



- Polymyositis, Dermatomyositis, Inclusion Body Myositis, Statin induced myositis
- Vitamin D level comparable to healthy subjects
- no association between clinical manifestations of disease and vitamin

D levels

> J Pediatr. 2012 Feb;160(2):297-302. doi: 10.1016/j.jpeds.2011.08.011. Epub 2011 Sep 15.

Disease activity, proteinuria, and vitamin D status in children with systemic lupus erythematosus and juvenile dermatomyositis

Angela Byun Robinson¹, Myrtle Thierry-Palmer, Keisha L Gibson, Consuelo Egla Rabinovich



Organ-Specific Autoimmune Diseases

- Multiple Sclerosis
- Autoimmune Thyroid Disease
- Celiac Disease
- Type I Diabetes Mellitus
- Crohn's Disease
- Primary Biliary Cirrhosis
- Autoimmune Skin Diseases

- Vitamin D deficiency is common in such conditions.
- Beneficial effects of vitamin D supplementation in some conditions
- Uncertain clinical benefit in some.

Autoimmune disease	Lower vitamin D levels vs. healthy subjects	Correlation with clinical manifestations or disease activity	Vitamin D receptors (VDR) polymorphism
Systemic lupus erythematosus	+	+	+ «
Antiphospholipids syndrome	+	+	Not reported
Rheumatoid arthritis	+	+	+
Systemic sclerosis	+	+	Not reported
Sjogren disease	Normal levels	+	Not reported
Undifferentiated connective tissue disease	+	+/-	Not reported
Mixed connective tissue disease	+	Not reported	Not reported
Inflammatory myopathies	Normal levels	-	Not reported
Multiple sclerosis	+	+	+
Autoimmune thyroid disease	+	+	+
Celiac	Normal levels	_	Not reported
Diabetes mellitus	+	+	+
Crohn's disease	+	+	+
Primary biliary cirrhosis	+	+	+
Autoimmune skin diseases	+	Not reported	Not reported
Alopecia areata	+	Not reported	ev Allergy Immunol. 2013 Oct;45(2):256-66



Some trials on Vitamin D supplementation for SLE

Trial	T cells		B cells	Innate immune cells (dendritic	Cytokines and antibodies in	
	CD 4	CD 8		cell, NK)	serum or plasma	
Terrier et al. 2012 (N=20)	No change in total % or #	No change in total% or #.	Decrease in % and # after 2 months, but after 6 months only in %	No change in % or # of NK cells	Anti-dsDNA decreased	
Abou-Raya et al. 2013 (N=267)				Decrease in IL- 1 β , IL-6, IL-18, and TNF α Decrease in anti- dsDNA, anti-Sm, and C4, but not anticardiolipin		



Some trials on Vitamin D supplementation for SLE

Trial	T cells		B cells	Innate immune cells (dendritic	Cytokines and antibodies in
	CD 4	CD 8		cell, NK)	serum or plasma
Piantoni et al.2015, (N= 34)	Upon Std Regime increase in % and # of iTreg but not tTreg. In Intensive Regime increased % iTreg and % tTreg, but not #.	Increase in % but not # of CD8 ⁺ in SR and IR.			No difference in anti-dsDNA between SR and IR



Some trials on vitamin D supplementation for RA

Trial	Numb er	Main finding
Salesi and Farajzadegan 2012	50	Modest, non-significant, improvement in tender joint count, swollen joint count, ESR, and VAS
Dehghan et al. 2014	40	Non-significant decrease in relapse rate
Hansen et al. 2014	22	No effects on DAS28, HAQ, or physician global assessment of RA Non-significant increase in pain Increased patient assessment of global health and patient global assessment of RA



On the other side



LABORATORY REPORT				
Name: For the second se	ID 🦛	Registered Reported Date:	14/05/201 14/05/201	96:19 PM 90:17 PM
Test	Your Result	Reference Range	Unit	Remark
Creatinine	0.7	[0.5 - 1]	mg/dL	
eGFR CKD-EPI Formula	109	[> 60]	ml/min	
Uric Acid	3.7	[2.5 - 6.2]	mg/dL	
ALT/SGPT	19	[< 33]	U/L	
Vitamin D(25-OH)	230.21		nmol/L	See Below
ESR	22	[< 25]	mm/1stHR	



Follow up Vasculitis patient On Vitamin D 10,000 IU / day for almost a year

Reference Ranges for 25 OH Vitamin D

Level	Clinical	
< 30 nmol/L	-Severe vitamin D deficiency. Suggest high dose supplementation	
30-50 nmol/L	-Vitamin D insufficiency, If bone health an issue, suggest standard-dose supplementation. No repeat vitamin D measurement required	
50-125 nmol/L	-Adequate. No action required ng/ml x 2.	5 = nmol/L
> 350 nmol/L	-Toxicity. Very rare.	



Supplements – popular nowadays

My patient's basket for supplements









Social media influence on supplements

≌≂ Filters City - Public groups My groups	္အော္ရွာ ဖြည့်စွက်စာဆေးအကြောင်းနှင့်အာနိသင်ဘယ်လိုရှိသလည်း
To A Better Health ဖြည့်စွက်စာ နှင့် Organic များကို စိတ်ဝင်စား သူများ ဆုံစ Group · 7.6K members	မှ မြင်မှ မြင်မှမမှ မြင်မှ မြင်မှမမှ မြင်မှ မြင်မှမမှ မြင်မှမမမှ မြင်မှမမမမမမမမမမမမမ
 ဖြည့်စွက်စာ ရောင်းသူ ဝယ်သူများဆုံးစည်းရာ 50 posts a day 5 friends are members 	 b posts a week 46 members said that they live in Mandalay
ဖြည့်စွက်စာကျွေးခြင်းနှင့် baby led weaning support group Group · 1.7K members	တြောင်း ခ week
 Baby led weaning က မြန်မာ မိဘတွေ သိပ်မလုပ်ကြသေးတော့ မေးစရာ မေးခွန်းတွေရှိရင် အချင်းချင်း မေးဖို.ရယ် အားပေးဖို. ဒီ group လေး လုပ်လိုက်ပါတယ်။ အခြား စိတ်ဝင်စား 20 posts a day 	 78 members said that they live in Mandalay
• 6 friends are members ကလေးဖြည့်စွက်စာအရေး သိလိုရာမေး Group · 62K members	
News Feed Friends Watch Notifications	MMA_Cho Mar Lwin 52



- 3 posts a week
- 20 members said that they live in Mandalay П





2 posts a day

55 members said that they live in Mandalay







Join

Join

- 20 posts a day
- 1 friend is a member
- 133 members said that they live in Mandalay **f**



ဖြည့်စွက်စာ (Supplements) နှင့်ပတ်သက်သော eBooks များ

Group · 77 members

- 0 👉 ဖြည့်စွက်စာ (Supplements), ကျန်းမာရေး (Health) နှင့်ပတ်သက်သော 📚 eBook (PDF, epub) များ ရယူနိုင်ပါတယ်ခင်ဗျာ...
- 2 posts a week
- 4 members said that they live in Mandalay fi.

- 🚺 ကျနော်တို့ ဂရုတွေ အကြောင်း
- 940 posts a day

•••

4 89 friends are members

•••

ဖြည့်စွက်စာကို ယုံကြည်သူများ (PUBLIC GROUP)

Group · 100K members

🕚 ကျနော်တို့ ဂရုတွေ အကြောင်း

🛢 60 posts a day

62 friends are members

Join

Join

Rheumato

- Group · 12K members
- 20 posts a day
- 8 friends are members
- 19 members said that they went to University of Medicine 1, Yangon

ဖြည့်စွက်စာကျွေးခြင်းအကြောင်းမေမေများအသိပညာဖလှယ်ရန် Group · 15K members

- ဖြည့်စွက်စာကျွေးခြင်းနဲ့ပက်သက်သော ကလေးနဲ့ပက်သ...
- 50 posts a day
- 6 friends are members

ဖြည့်စွက်စာဆေးများ ရောင်းဝယ်ရေး (Supplement)

Group · 2.3K members

Doctors Say Vitamins are safe and Effective


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"တနေ့ သံတွဲဘက်ကဆရာတော်တပါး ခရိုင်ဆေးရုံကလက်မခံ
     တော့လို့ တိုင်းဆေးရုံတက်ကုသခံတာ တပတ်ကြာတော့ ဆေးရုံက
     အဆုတ်ကြွက်သားက အလုပ်မလုပ်တော့လို့ သက်တော်က၈၂
     အစာလဲမဝင် အိပ်လဲမအိပ် အမောဖေါက်နေလို့ လက်လျော့ပြီး
     ဆေးရုံကဆင်းခိုင်းလိုက်ပါတယ်။
ம் Like
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Write a comment...

Vit D MMA Cho

GIF

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ကြွက်သားတွေ လိုအပ်မဲ့ Magnesium 600mg 2-0-2
20 probiotic 2လုံး
vitamin D3 5000 1လုံး
super k 1လုံး
Zinc
        1လုံး
အစာချေနိုင်ဘို့
digestic enzyme အစာမစားခင်အချိန်မှန်းပြီ 2လုံး
Oxbile 1လုံး
အမောသက်သာဘို့
D-ribose စတီးဇွန်းတဇွန်း
Coq10 200mg
L Carnitine 1လုံး
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56

Public Awareness of Vitamin D Increased with COVID -19 Pandemic

The need for public education on Vitamin D

Summary

- Vitamin D deficiency is common among autoimmune conditions due to multiple factors
- Risks of autoimmune (and cardiovascular, cancer, infectious) diseases are higher when vitamin D levels are low
- The presence of Vitamin D Receptor (VDR) polymorphisms may further support such plausible pathogenic link
- Current available data hold many inconsistencies
- Reverse causation is also likely as low vitamin D level may be the consequence, not the cause

Summary

- No convincing randomized trial data that vitamin D supplements can decrease the risk or severity or prognosis of such conditions
- However, Vitamin D supplementation recommended in autoimmune diseases
- Prevention of steroid induced osteoporosis in all patients on regular long term treatment
- Although vitamin D toxicity is rare owing to a large therapeutic range, its widespread availability in various over-the-counter formulations may pose a substantial risk to uninformed patients/ public

Thank you!