designs for health® Australia

Breaking the Cycle of Inflammatory Dislipedaemia

Presenter:
Dr Barrie Tan, Ph.D.

Host: Lea McIntyre

Presenter | Dr Barrie Tan, Ph.D.

CSO, Designs for Health | Founder, American River Nutrition

Dr Barrie Tan, considered one of the world's foremost experts on vitamin E, is a pioneer in tocotrienol research with a Ph.D. in Chemistry/Biochemistry from the University of Otago, New Zealand.

Dr Tan discovered tocotrienols from palm, rice, and annatto sources and developed DeltaGold® – the first tocopherol-free tocotrienol product extracted from annatto. This breakthrough research has proven significant for addressing inflammatory dyslipidaemia and related cardiometabolic disorders.

As founder of the International Tocotrienol Conference and editor of two prestigious books on the subject, Dr Tan's research demonstrates how annatto-derived delta and gamma tocotrienols outperform alpha-tocopherol in reducing inflammatory markers, improving lipid profiles, and supporting patients with cardiovascular disease, metabolic syndrome, type 2 diabetes, and NAFLD.

President of American River Nutrition, Dr Tan continues advancing clinical applications that bridge the gap between conventional treatments and the inflammatory component of cardiometabolic disorders, believing tocotrienols may be "the most important antioxidant discovery in our lifetime."

Our Host | Lea McIntyre

Lea McIntyre is head of Marketing at Designs for Health Australia.

She has 20 years experience as a qualified naturopath, herbalist and nutritionist. In her clinical practice, she has a special interest in paediatric health and gut health and the relationship between inflammation and neurological conditions.

Lea has developed a strong relationship with the Designs for Health practitioner community. She will moderate the Q&A discussion with Dr Tan in this webinar and engage our live Designs for Health practitioner community to bring insight and practical clinical pearls for all.

Annatto Tocotrienol

Chronic and Cardiovascular Health Support

Roadmap

- **Annatto History & Vitamin E Background**
- Tocotrienol (T3) Benefits
- Geranylgeraniol (GG) Background
- Geranylgeraniol Benefits

Four Decade Journey at a Glance

1. Palm Tocotrienol

- 1980s in Malaysia
- Visit to a palm plantation

2. Rice Tocotrienol

- 1990s in Thailand
- Call from a Prince of Thailand

3. Annatto Tocotrienol

- 2000s in Peru
- Search for giant marigolds

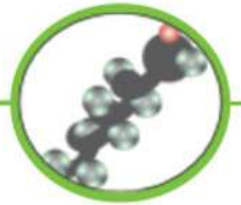
4. Staying with Annatto T3 & GG

- 2010s in USA
- Production and clinical trials

Vitamin E: A Century of Research

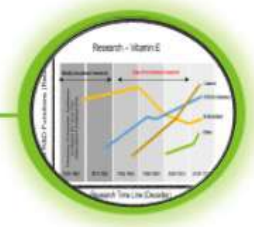
1922: Fetal reabsorption prevention

1937: Antioxidant properties

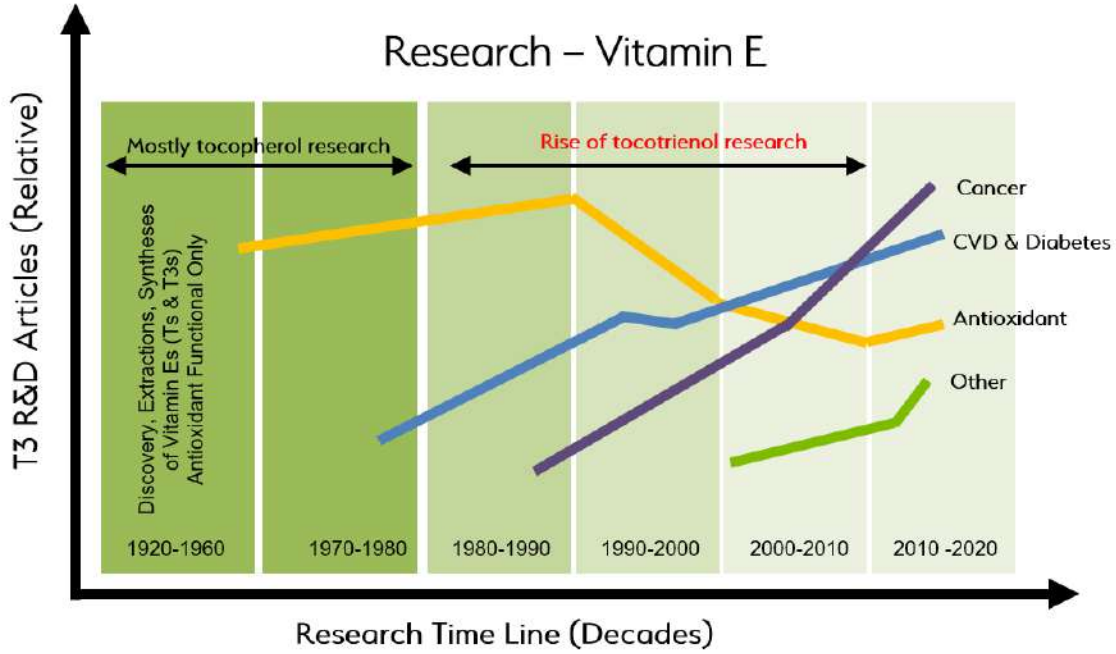


1964: Tocotrienol discovered

2003: Annatto T3 first in commerce



2022: Continued rise of T3 research

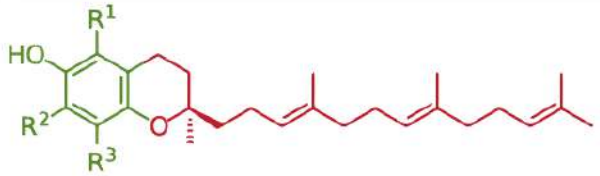


Structure: 8 Distinct Vitamers

Tocopherol (T)

- Alpha T
- Beta T
- Delta T
- Gamma T

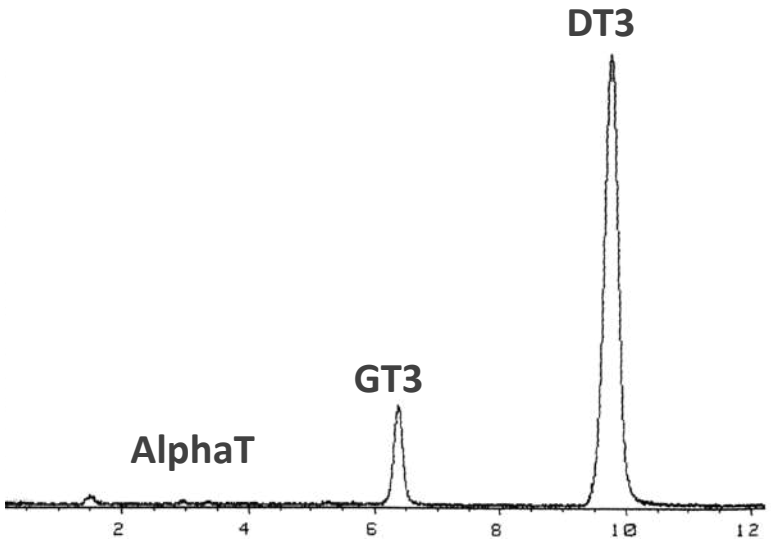
Tocotrienol (T3)

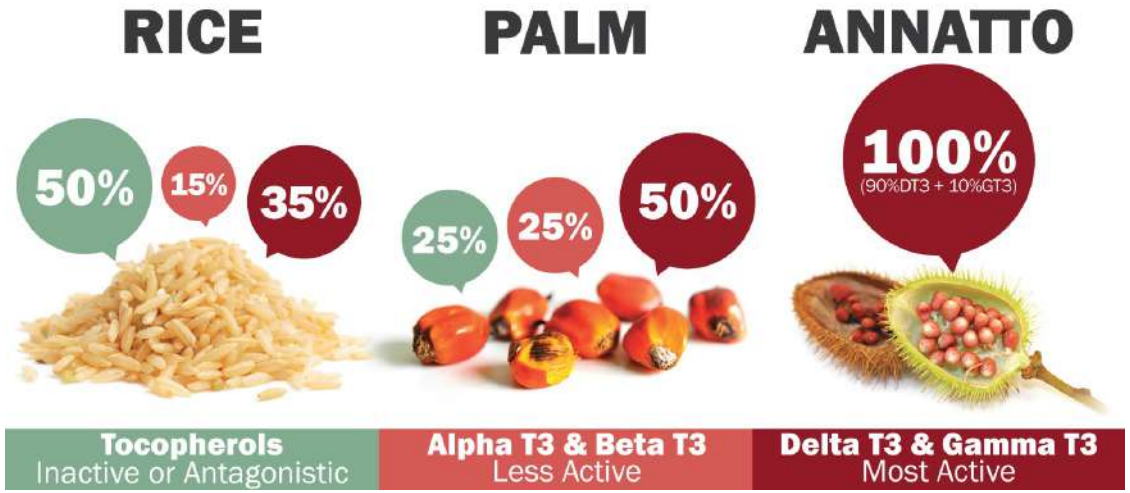


- Alpha T3
- Beta T3
- Delta T3
- Gamma T3

- Most Vitamin E supplements are filled with tocopherols.
- Annatto is uniquely tocotrienols.

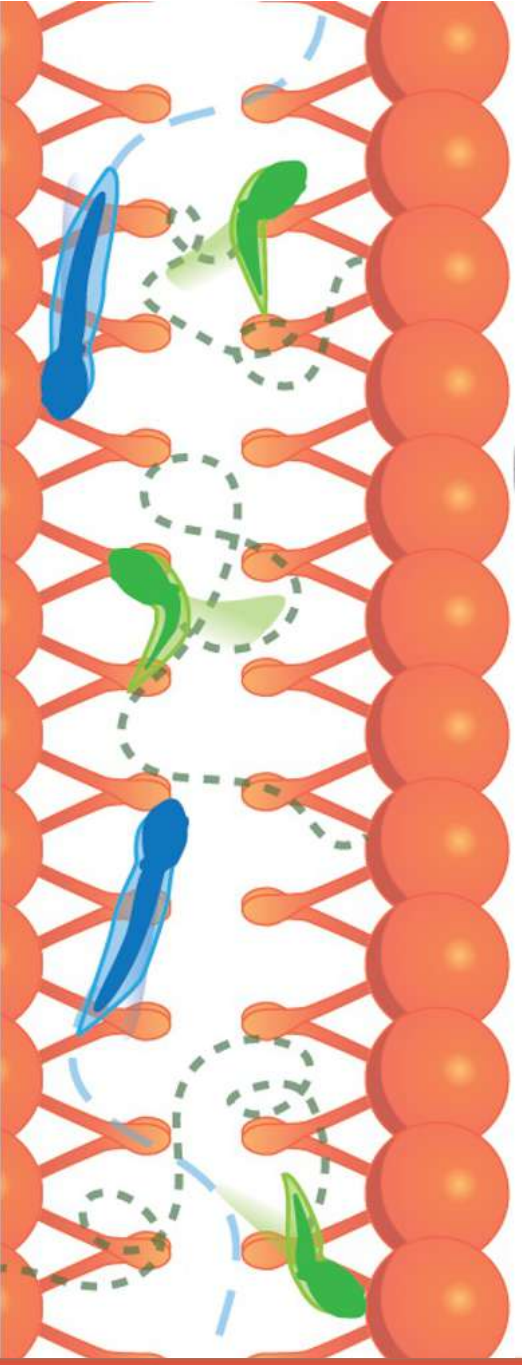
Composition Matters





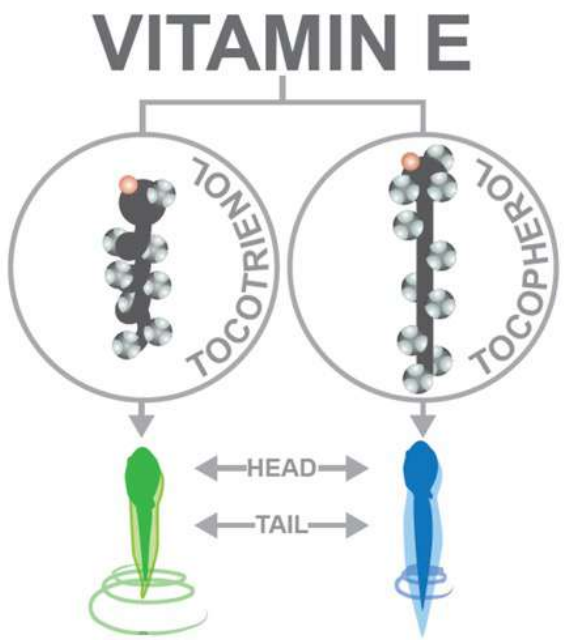
- Plant-based
- Physical process
- Made in USA

- Only 3 sources (Rice, Palm, Annatto)
- Annatto Tocotrienol – Best in Class
- Annatto GG – First in Class



Why Tocotrienol Works So Well

- 38t cells/person: 5,000x world population
- > 90% phospholipid antioxidants are tocochromanols
- < 10% HC carotenoids (beta-carotene & lycopene)
- 50x more potent



Shorter tail =
greater flexibility and mobility

So why not Alpha-Tocopherol?

Alpha-Tocopherol Interferes with Tocotrienol

- Inhibits absorption
- Reduces adipose storage
- Compromises cholesterol and triglyceride reduction
- Attenuates cancer inhibition
- Exacerbates stroke injury

Alpha-T puts brakes on T3 functions

Alpha-Tocopherol Problems in Physiological Functions

- Oxidizes ‘good’ HDL and ‘bad’ LDL (50mg/d & 400mg/d)
- Increases inflammation of TNF_{α} (13–40%↑) & IL_6 (21–22%↑)
- Raises mortality and cancer (breast, prostate, lung) risks
- Blocks/Lowers chemo’s effectiveness (400mg/d for 1 mth)
- Increases cardiac risk in PMW (300mg/d for ~3yr)

Alpha-T has too many land mines

Recap

- Tocotrienol is a recent discovery
- Vitamin E = 4 tocotrienols and 4 tocopherols
- Annatto has the most potent tocotrienol
- Alpha-tocopherol interferes with tocotrienol

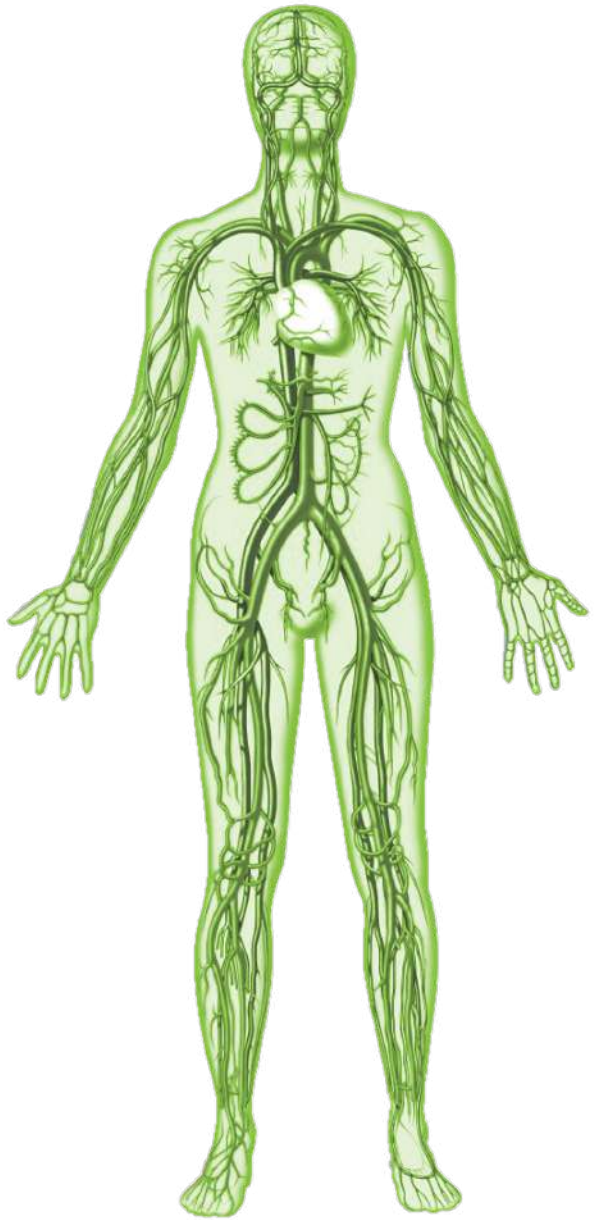
US Population (340m) with Chronic Conditions (170m)

- Adults (≥18yr) 80% or **270m**
  - CVD: 50% or **135m**
  - MetS: 1-in-3 or **100m**
    (TG↑, BP↑, WC↑, HDL↓)
  - Prediabetes: 1-in-3 or **90m**
    (FG 100-124 mg/dL, Alc 5.7-6.4%)
  - NAFLD: **85m**
  - PMW with Osteoporosis risk (♀ ≥50yr): **65m**
  - T2DM: **35m**

Two-in-three Adults have Chronic Conditions

Tocotrienol Benefits

- **Cardiovascular Disease (CVD)**
- Inflammation
- Lipids & Oxidation
- Atherosclerosis



The human body contains

30,000 miles of arteries

1.2 x the circumference of the earth

or

10 x the distance from NY to LA

Arteries carry blood cells to import oxygen & nutrients and to export carbon dioxide & wastes to

38 trillion cells

5000x World Population

Annatto T3 Reduces Lipids in Preclinical Study

Lipid (mmol.L)	Control (2% chol. in feed)	T3 Treatment	% Change	Remarks
Cholesterol	31.5	22.8	27.6%↓	• T3 targets the down-regulation of HMGR enzyme • Neat drop possibly because of absence of alpha-T*
LDL	27.7	19.5	29.6%↓	
HDL	2.58	2.68	3.9%↑	• HDL and TG trend well with MetS control
TG	1.61	1.41	12.4%↓	
TG/HDL	0.624	0.526	15.7%↓	• Predicts small dose LDL drop

- This rabbit dosage translates to **135 mg/d** in a 70kg person
- Findings justify a clinical study to validate lipid findings

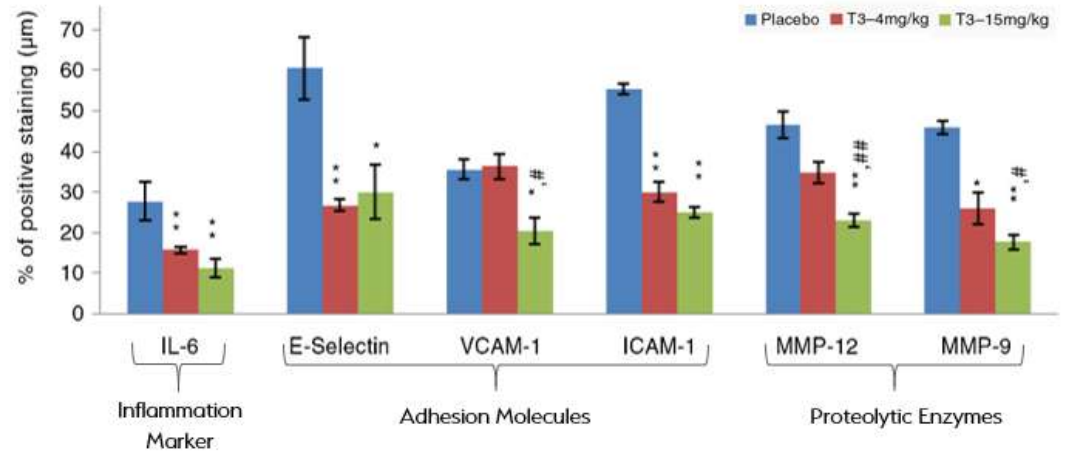
Shahid U, Khan DA, Noor U, Butt SH. Effect of tocotrienols on lipid profile in rabbits. JRMC. 2012;16(1):68-9.
**Hasselwander O, Kraemer K, Hoppe PP, Oberfrank U, Baldenius K, Schroeder H, et al. Effects of feeding various tocotrienol sources on plasma lipids and aortic atherosclerotic lesions in cholesterol-fed rabbits. Food Res Int'l. 2002;35:245-51.*
**Yu SG, Thomas AM, Gapor A, Tan B, Qureshi N, Qureshi AA. Dose-response impact of various tocotrienols on serum lipid parameters in 5-week-old female chickens. Lipids. 2006;41(5):453-61.*

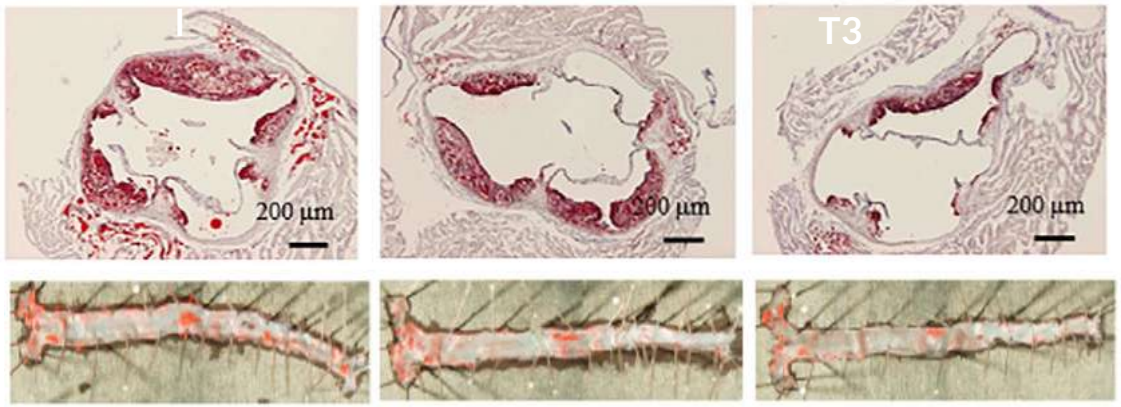
DT3 Reduces Chemotaxis & Atherosclerosis

"Velcro Effect" Reductions

- Inflammation Marker ↓
- Adhesion Molecules ↓
- Proteolytic Enzymes ↓

Translated dosage
for a 70kg person:
340mg/day



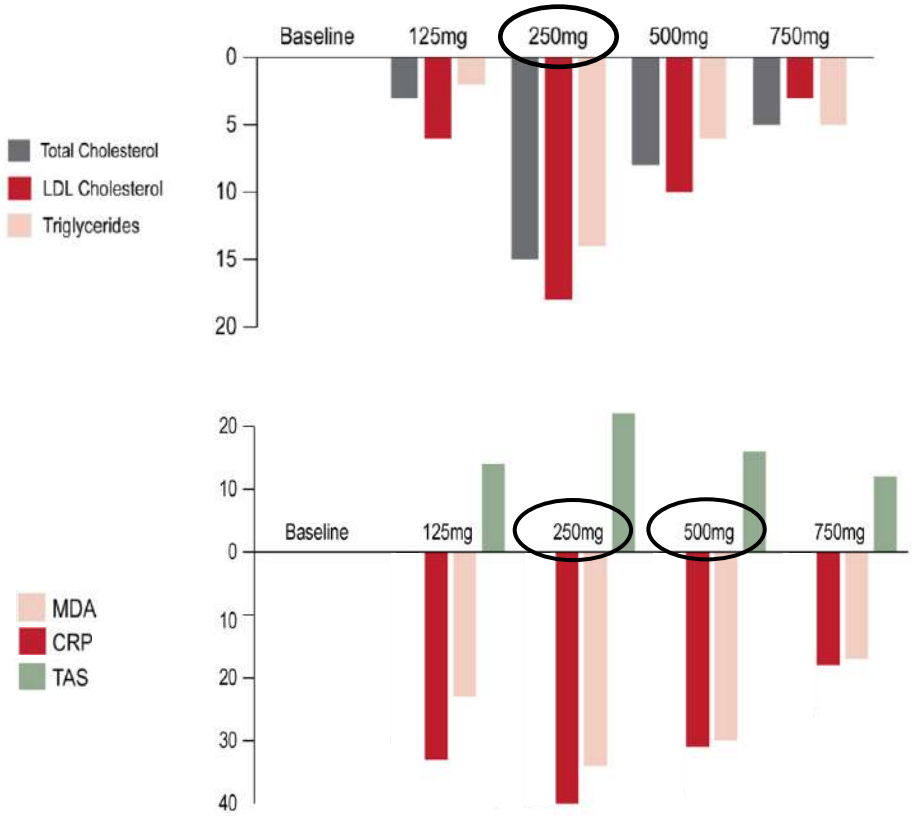


24%

36%

Shibata A, Kobayashi T, Asai A, Eitsuka T, Oikawa S, Miyazawa T, et al. High purity tocotrienols attenuate atherosclerotic lesion formation in apoE-KO mice. J Nutr Biochem. 2017;48:44-50. Epub 2017/08/02.
Rahman TA, Hassim NF, Zulkafli N, Muid S, Kornain NK, Nawawi H. Atheroprotective effects of pure tocotrienol supplementation in the treatment of rabbits with experimentally induced early and established atherosclerosis. Food & nutrition research. 2016;60:31525. Epub 2016/11/02.

DT3 Reduces Cholesterol & Inflammation in Hypercholesterolemic Subjects



125mg/d

CRP: 30% ↓

MDA 24% ↓

TAS: 12% ↑

250-500mg/d

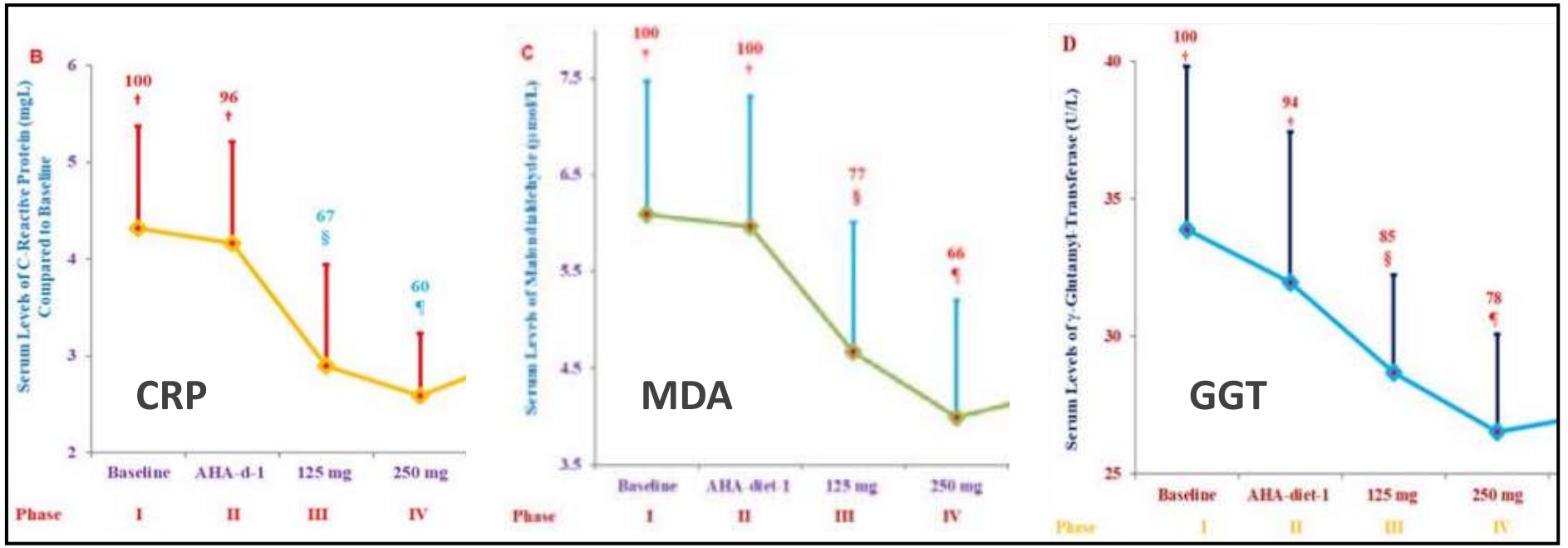
CRP: 40% ↓ TC: 15% ↓

MDA 34% ↓ LDL: 18% ↓

TAS: 22% ↑ TG: 14% ↓

Qureshi, A.A., et al., Dose-dependent modulation of lipid parameters, cytokines, and RNA by delta-tocotrienol in hypercholesterolemic subjects restricted to AHA Step-1 diet. Brit J of Med & Med Res, 2015. 6(4): p. 351-366.
Qureshi AA, Khan DA, Mahjabeen W, Trias AM, Silswal N, Qureshi N. Impact of delta-tocotrienol on inflammatory biomarkers and oxidative stress in hypercholesterolemic subjects. Clin. Exp. Cardiology. 2015;6(4):1000367.

DT3 Improves Markers in Hypercholesterolemic Subjects

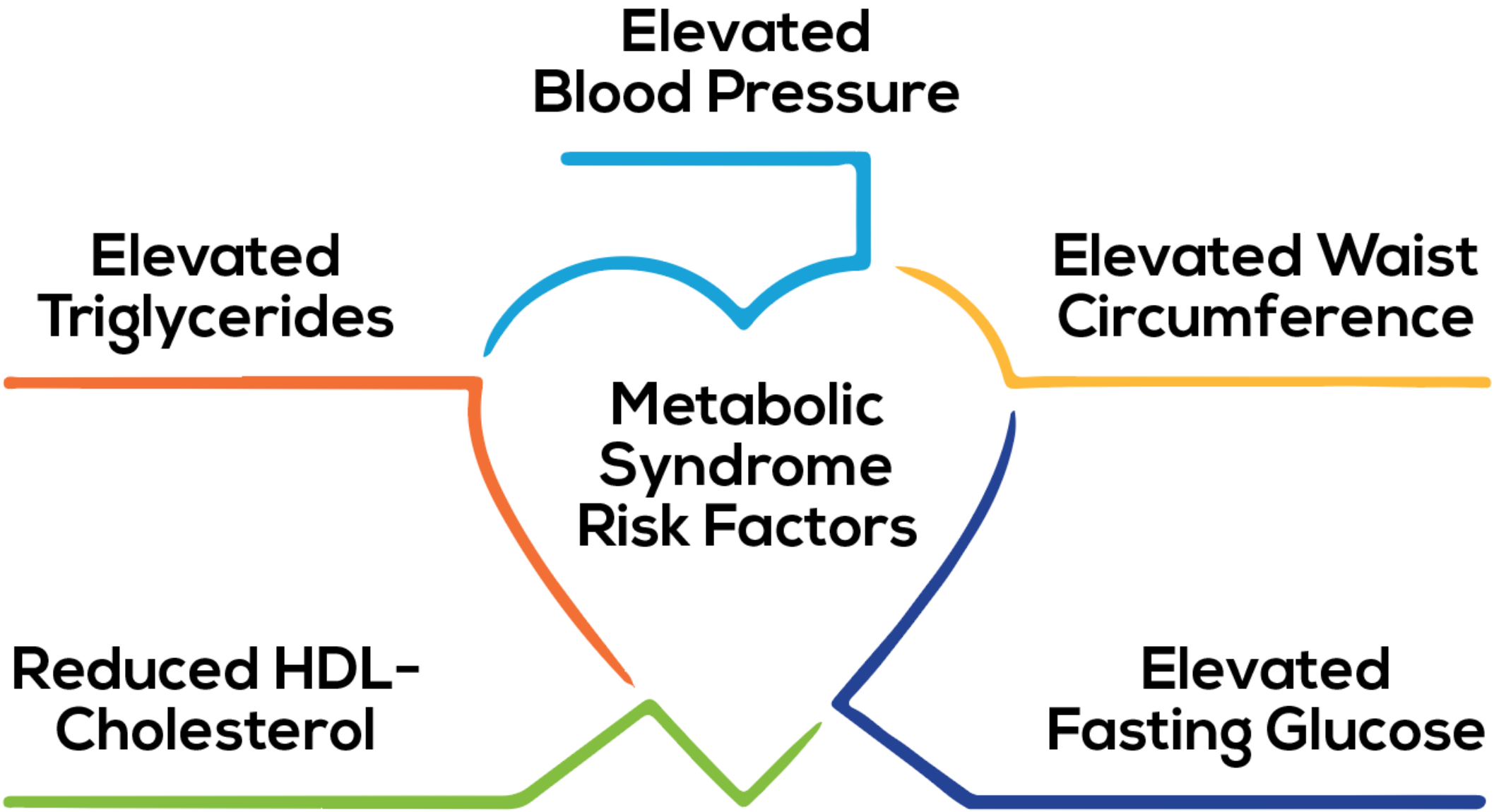


- Reduces inflammation (CRP↓)
- Reduces lipid oxidation (MDA↓)
- Improves liver and cardiovascular functions (GGT↓)

Qureshi, A.A., et al., Dose-dependent modulation of lipid parameters, cytokines, and RNA by delta-tocotrienol in hypercholesterolemic subjects restricted to AHA Step-1 diet. Brit J of Med & Med Res, 2015. 6(4): p. 351-366.
Qureshi AA, Khan DA, Mahjabeen W, Trias AM, Silswal N, Qureshi N. Impact of delta-tocotrienol on inflammatory biomarkers and oxidative stress in hypercholesterolemic subjects. Clin. Exp. Cardiology. 2015;6(4):1000367.

Tocotrienol Benefits

- **Cardiometabolic Disease (CMD)**
- NAFLD
- Pre-Diabetes (MetS/IR)
- T2DM
- Bone Health



DT3 and Polyphenol Combo Helps Healthy Elderly

Marker	Before	After	% Change	Remarks
GGT (U/L)*	26	21	19%↓	CVD/CMD markers dropped
CRP (mg/L)[1]	2.1	1.4	33%↓	Inflammation marker reduced
TAS (mmol/L)	1.45	1.61	11%↑	Endogenous antioxidant status improved

Healthy men & women (60-67yo) for 4 weeks

Combo (Tocotrienol **200mg/d**, Quercetin **300mg/d** and Resveratrol **100mg/d**)

Khan DA, Mahjabeen W, Khan FA. Effects of delta-tocotrienol and polyphenol on ageing induced oxidative stress and inflammation in humans. Pakistan J Path. 2009:55-9.
**Dhingra R, Gona P, Wang TJ, Fox CS, D'Agostino RB, Sr., Vasan RS. Serum gamma-glutamyl transferase and risk of heart failure in the community. Arterioscler Thromb Vasc Biol. 2010;30(9):1855-60. Epub 2010/06/12*
**Onur S, Niklowitz P, Jacobs G, Nothlings U, Lieb W, Menke T, et al. Ubiquinol reduces gamma glutamyltransferase as a marker of oxidative stress in humans. BMC research notes. 2014;7:427. Epub 2014/07/06.*
1 Ridker PM. From C-Reactive Protein to Interleukin-6 to Interleukin-1: Moving Upstream To Identify Novel Targets for Atheroprotection. Circ Res. 2016;118(1):145-56. Epub 2016/02/04.
1 Ridker PM. Clinician's Guide to Reducing Inflammation to Reduce Atherothrombotic Risk: JACC Review Topic of the Week. Journal of the American College of Cardiology. 2018;72(25):3320-31. Epub 2018/11/13.
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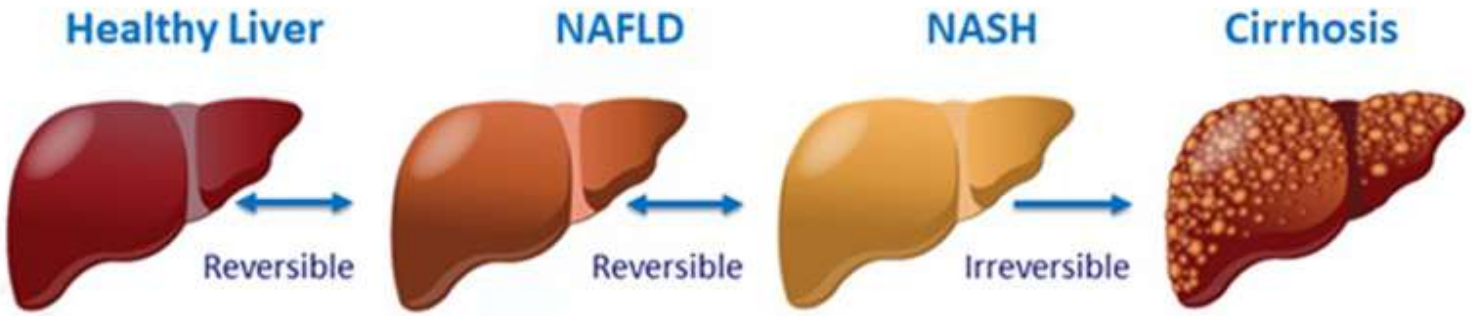
Global NAFLD Prevalence is 20-30%

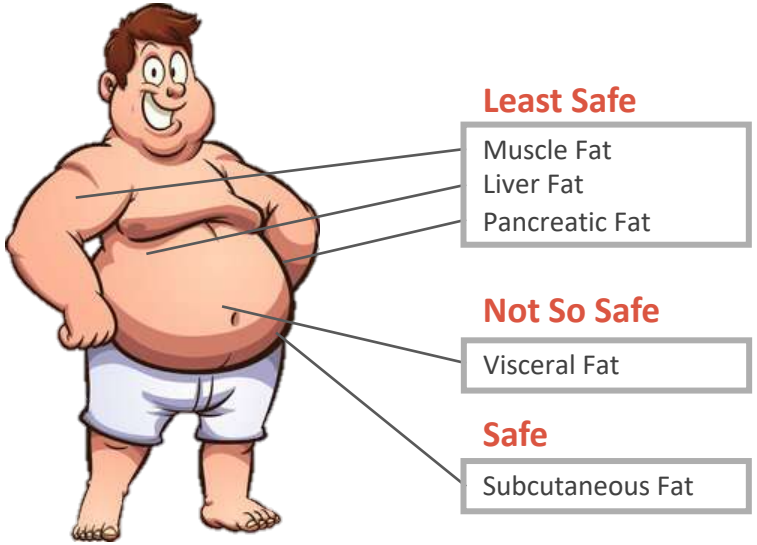


80-100m Americans have NAFLD (30% of adults)

20% transition to non-alcoholic steatohepatitis (NASH)

Complications: Inflammation, Fibrosis, Infections, Cancer

Livers look like those of heavy drinkers but they are not



Das, S.L., et al., Newly diagnosed diabetes mellitus after acute pancreatitis: a systematic review and meta-analysis. Gut, 2013.
Gukovsky, I., et al., Inflammation, autophagy, and obesity: common features in the pathogenesis of pancreatitis and pancreatic cancer. Gastroenterology, 2013. 144(6): p. 1199-209 e4.
Fiore, K. Losing Fatty Liver Cuts Diabetes Risk. MedPage Today 2013.
Le, M., Devaki, P., Ha, N., Jun, D., Te, H., Cheung, R. and Nguyen, M. (2017). Prevalence of non-alcoholic fatty liver disease and risk factors for advanced fibrosis and mortality in the United States. PLOS. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0173499.
Estes, C., Razavi, H., Loomba, R., Younossi, Z. and Sanyal, A. (2018). "Modeling the Epidemic of Nonalcoholic Fatty Liver Disease Demonstrates an Exponential Increase in Burden of Disease." Hepatology, 67(1).

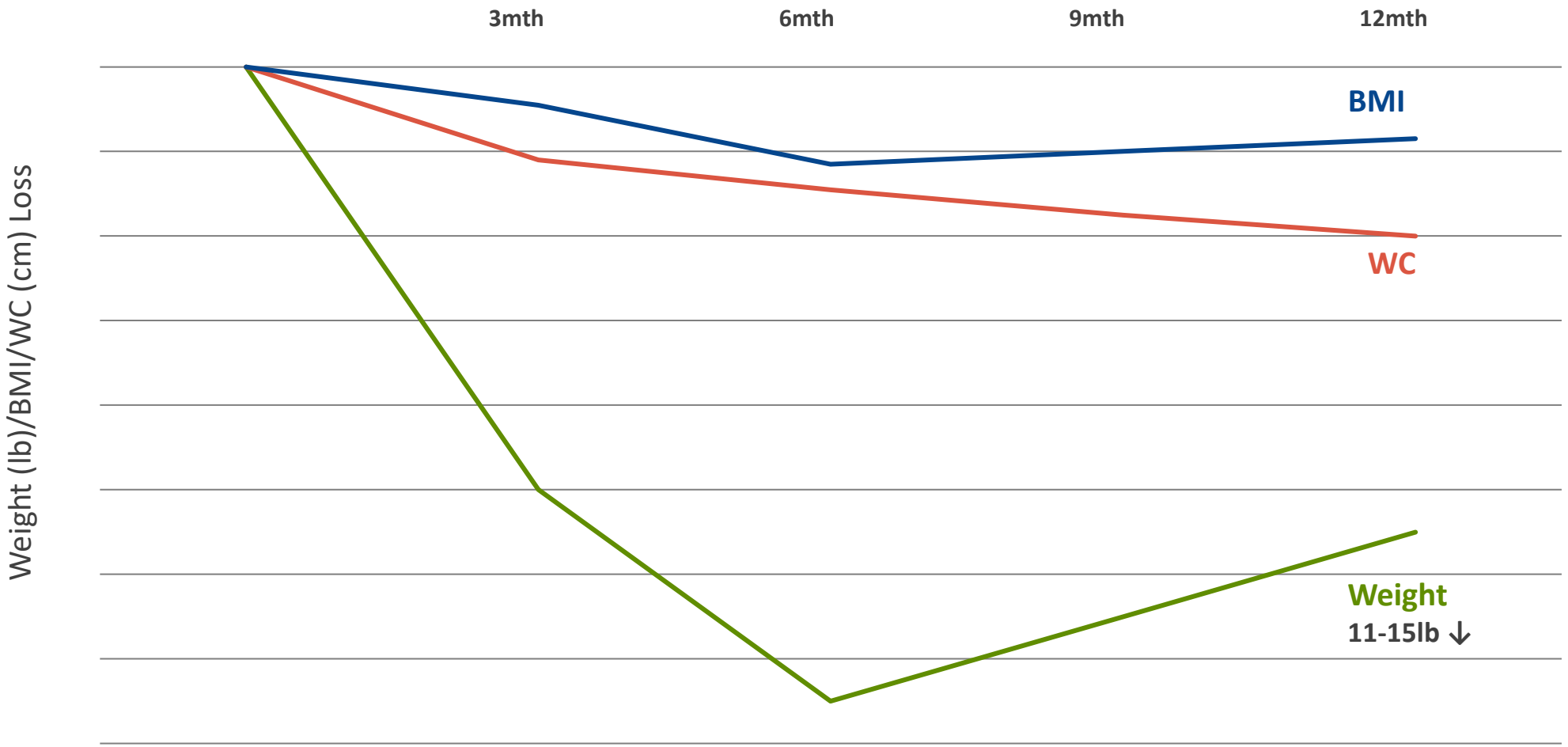
Delta-Tocotrienol Improves Fatty Liver in NAFLD Patients

Three RDBPC trials in patients (80-100) on 300mg twice daily

Detectors	Study Parameters	3 mth*	6 mth+	12 mth^
Patient	Weight Loss (lb)	10	15	11
	BMI (kg/m2)	30.7 → 29.2	30.6 → 28.3	32.8 → 31.1
	Waist Circumference (cm)	100.2 → 98.0	100.4 → 97.5	106.5 → 102.5
HP & Doctors	Triglycerides	9.9%↓	13% ↓	16%↓
	ALT & AST	15% - 16%↓	18% - 21%↓	29%↓
	ALP & GGT	8% - 17%↓	17%↓	37%↓
	hsCRP	18%↓	21%↓	38%↓
	MDA	14%↓	19%↓	13%↓
Specialists	FIB-4, NFS (fibrosis)	------	11.4%↓	20.1%↓
	CK18 (**cirrhosis**, **liver cell death**)	------	18.3%↓	19.8%↓
	FLI (**steatosis**)	11.1%↓	15%↓	17%↓
	HOMA-IR homeostatic model assessment of insulin resistance	------	15%↓	24%↓

*Pervez MA, Khan DA, Ijaz A, Khan S. Effects of Delta-tocotrienol Supplementation on Liver Enzymes, Inflammation, Oxidative stress and Hepatic Steatosis in Patients with Nonalcoholic Fatty Liver Disease. The Turkish journal of gastroenterology : the official journal of Turkish Society of Gastroenterology. 2018;29(2):170-6.
+Pervez MA, Khan DA, Slehria AUR, Ijaz A. Delta-tocotrienol Supplementation Improves Biochemical Markers of Hepatocellular Injury and Steatosis in Patients with Nonalcoholic Fatty Liver Disease. TJG
^Pervez, Muhammad Amjad, et al. "Delta-Tocotrienol Supplementation Improves Biochemical Markers of Hepatocellular Injury and Steatosis in Patients with Nonalcoholic Fatty Liver Disease: A Randomized, Placebo-Controlled Trial." Complementary Therapies in Medicine, vol. 52, 2020, p. 102494., doi:10.1016/j.ctim.2020.102494.

Delta-Tocotrienol Sustains Weight Loss in NAFLD Patients



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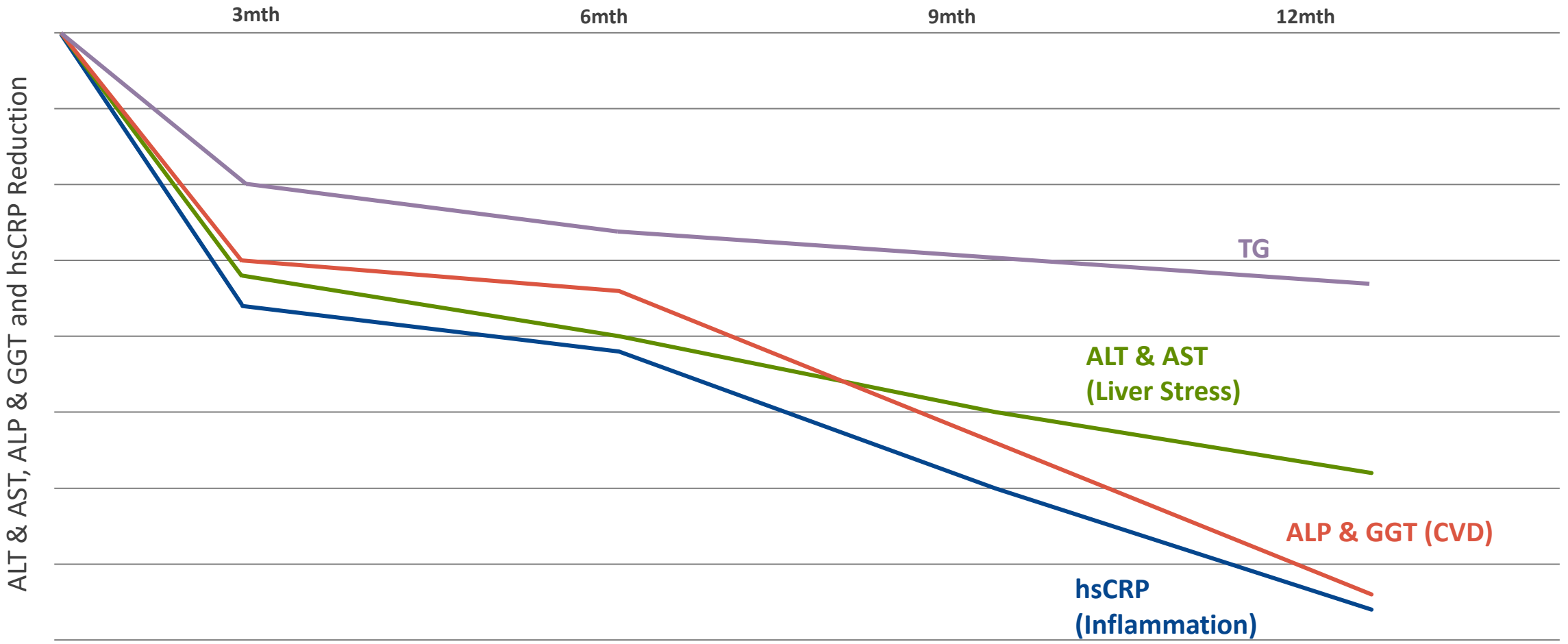
Delta-Tocotrienol Reduces Elevated Liver Enzymes in NAFLD Patients



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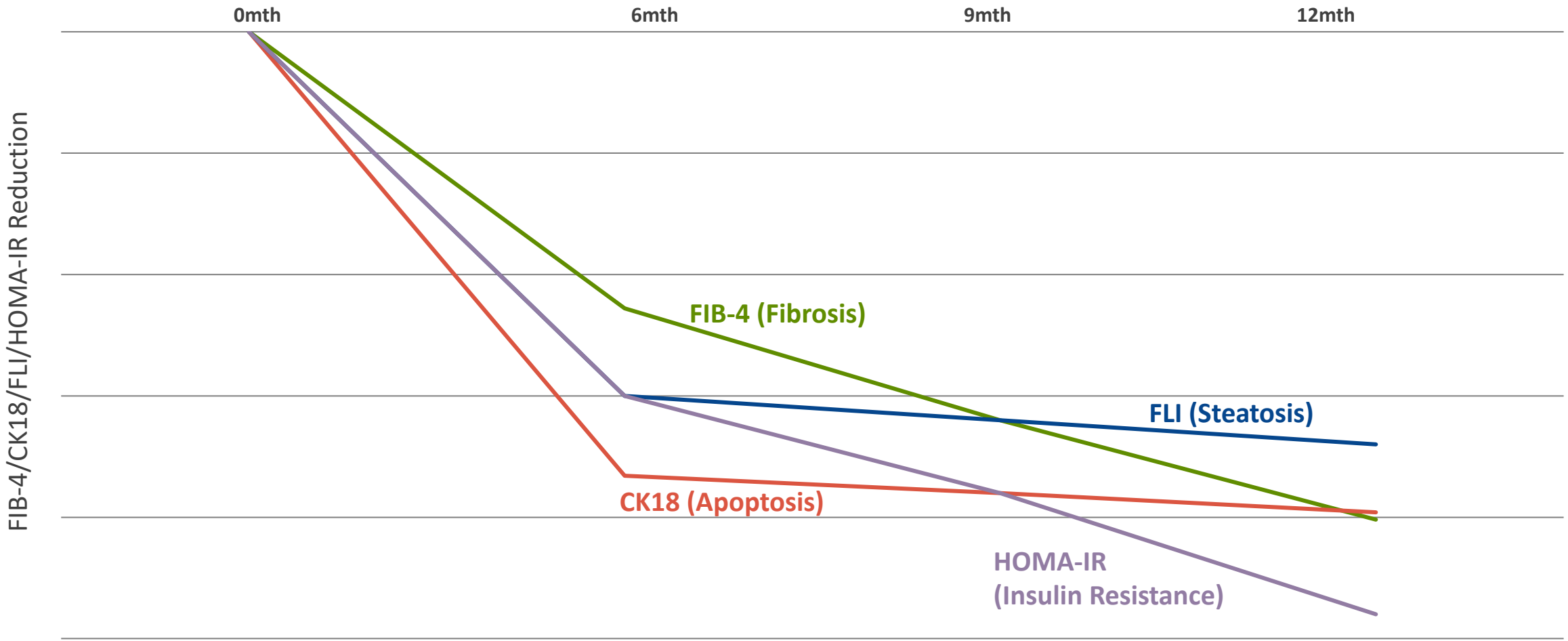
Delta-Tocotrienol Reduces Biomarkers in NAFLD Patients



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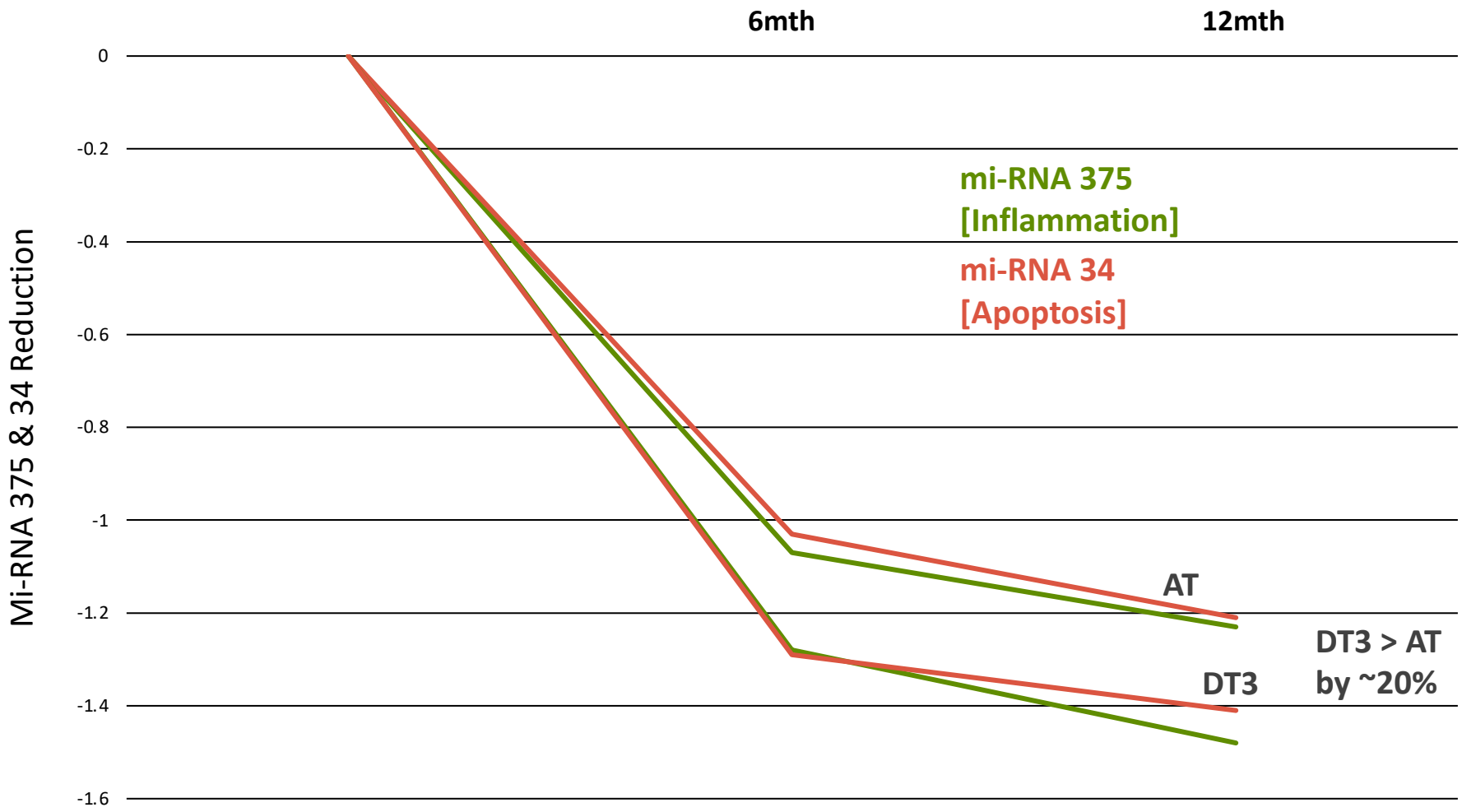
DT3 Supersedes AT to Decrease Inflammation & Liver Cell Apoptosis in NAFLD Patients



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^Pervez, Muhammad Amjad, et al. "Delta-Tocotrienol Supplementation Improves Biochemical Markers of Hepatocellular Injury and Steatosis in Patients with Nonalcoholic Fatty Liver Disease: A Randomized, Placebo-Controlled Trial." Complementary Therapies in Medicine, vol. 52, 2020, p. 102494., doi:10.1016/j.ctim.2020.102494.
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DT3 Improves Glycemic Control in Prediabetics

- Clinical Trial
  - RDBPC, 3mth, DeltaGold® **300mg/day**
  - 77 prediabetic patients (FPG 100-124mg/dl; A1c 5.7-6.4%)

	T3-Supplemented	Placebo
A1C	6.04 → 5.77% (4.5%↓)	5.99 → 6.04% (0.8%↑)
FPG	4.3%↓	0.2%↓
Insulin	11.2%↓	3.0%↓
HOMA-IR	15.1%↓	3.7%↓

Suleman, F., et al., Effects of delta-tocotrienol supplementation on glycaemic control in individuals with prediabetes: A randomized controlled study. J Pak Med Assoc, 2022. 72(1): p. 4-7.

DT3 Reduces Central Obesity and Inflammation in MetS Patients

Combo (**δ T3 500mg/d + Resveratrol 300mg/d**) for 6mth on MetS patients

Primary Endpoints:

- SBP/DBP (**5.2%/5.8%↓**)
- WC ♂/♀ (**3.7%/4.6%↓**)
- Weight Loss (**4.6% or 9.3lb↓**)
- TG (**16%↓**)
- HDL ♂/♀ (**4.0%/5.1%↑**)

Secondary Endpoints:

- Inflammation (**15-17%↓**)
- Adiponectin (**11%↑**)
- VCAM (**27%↓**)
- MDA (**7.5%↓**)
- TAS (**23%↑**)

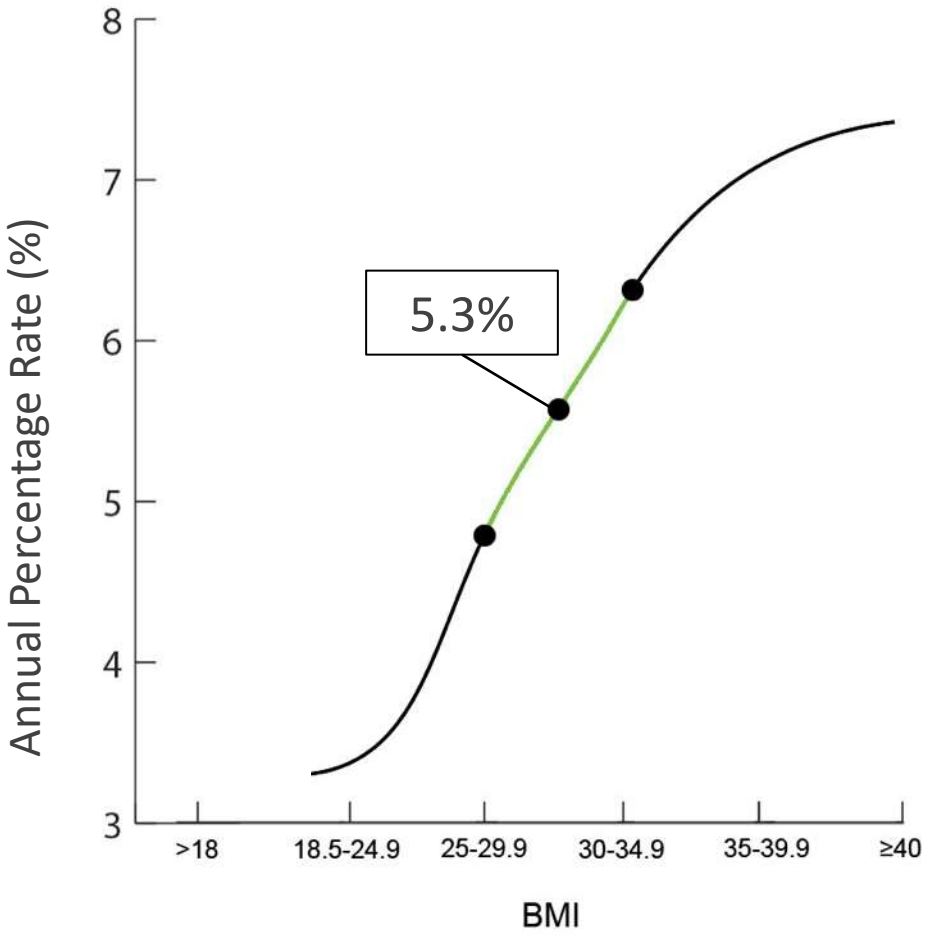
Conclusions:

- Combo reversed MetS & Central Obesity in young adults (18-43yr)
- Combo reduced Inflammation and Atherosclerosis
- Combo averted PreD-to-T2DM; Obesity with DT3?

For Obesity Study
Adiponectin↑
Leptin↓

Fatima, S., et al., delta-Tocotrienol in Combination with Resveratrol Improves the Cardiometabolic Risk Factors and Biomarkers in Patients with Metabolic Syndrome: A Randomized Controlled Trial. Metab Syndr Relat Disord, 2023. 21(1): p. 25-34.

Delta-Tocotrienol Averts Pre-Diabetes to T2DM Conversion



- CDC says progression of A1c-confirmed PreD-to-T2DM is **5.3%** in older adults
- US has **95m** Pre-diabetics
- APR approximates BMI

Window of opportunity for T3 to *avert* PreD-to-T2DM

Evidence of T3 in PreD-T2DM non-progression

Koyama, A.K., et al., Progression to Diabetes Among Older Adults With Hemoglobin A1c-Defined Prediabetes in the US. JAMA Netw Open, 2022. 5(4): p. e228158.

DT3 Improves Metabolic Parameters of T2DM Patients

Randomized, double-blind, placebo-controlled trials
6mth study with 60-110 patients

Study Parameters	Results (**250mg/d**)	Results (**500mg/d**)
Glucose	6.8%↓	7%↓
HbA1c	6.3%↓	8%↓
Insulin	7.6%↓	9%↓
HOMA-IR	13.1%↓	14%↓
Triglycerides	10.3%↓	8%↓
hs-CRP	10.1%↓	12%↓
IL-6	15.9%↓	9%↓
TNF-alpha	13.7%↓	14%↓
MDA	8.8%↓	11%↓

Mahjabeen, W., et al. (2021). "Effects of delta-tocotrienol supplementation on Glycemic Control, oxidative stress, inflammatory biomarkers and miRNA expression in type 2 diabetes mellitus: A randomized control trial." Phytother Res.
Qureshi, A. A., et al. (2021). "A Novel Mixture of δ-Tocotrienol, Vitamin D3, Resveratrol (NS-3) Significantly Decreases Diabetes Biomarkers Including Inflammatory in People with Type 2 Diabetes." J Diab Clin Stud 5(1).
Values not adjusted against placebo
For Practitioner Use Only. This content is not medical advice. These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

Tocotrienol Benefits

- **Bone Health**

Annatto tocotrienol preclinical studies…

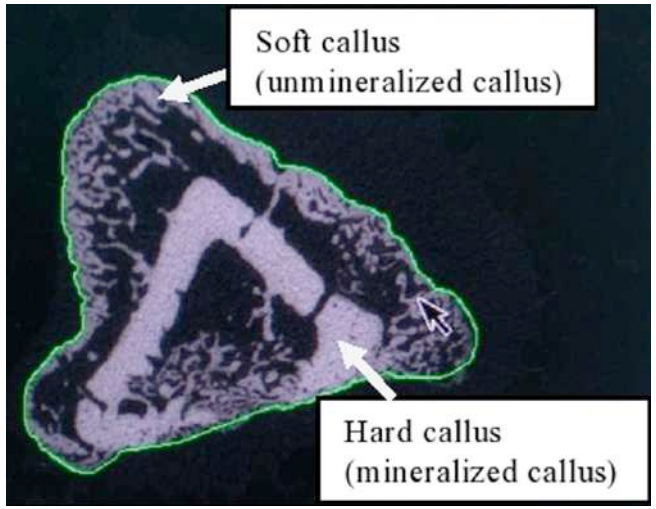
- Ovariectomized model – for women > 45 years
- Orchiectomized model – for men > 65 years
- HFHC diet (MetS & OP) model – both men & women
- Cigarette smoke & nicotine – toxicant induced
- Chronic steroid medicines – drug induced
- Fractured bone model – healing process

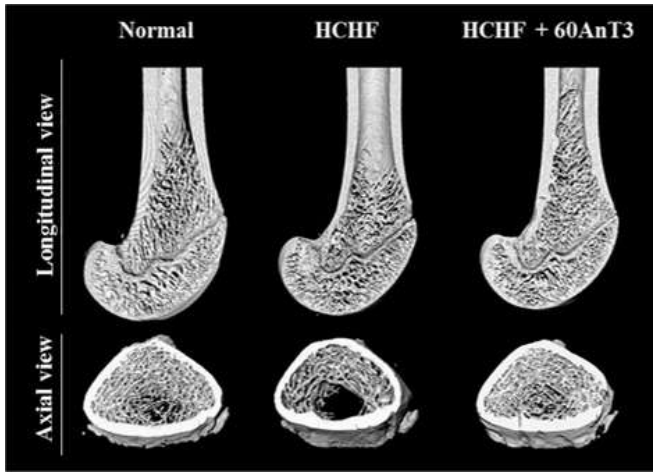
Osteoporosis
Osteoblast ↓
Osteoclast ↑

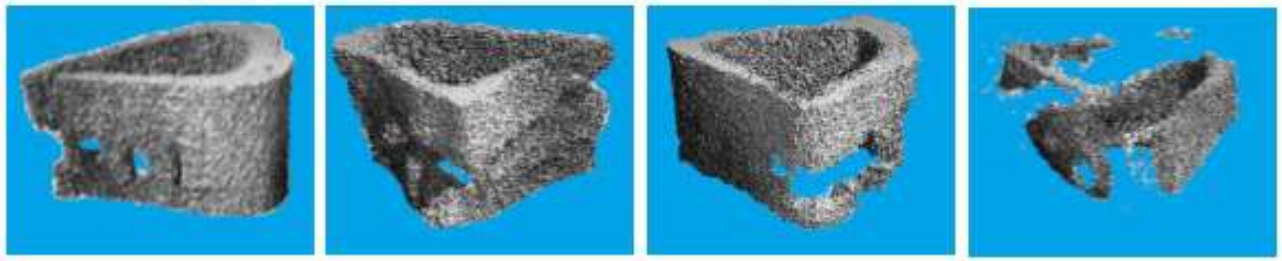
…promote bone formation following resorption.

Chin, K.Y. and S. Ima-Nirwana, Effects of annatto-derived tocotrienol supplementation on osteoporosis induced by testosterone deficiency in rats. Clin Interv Aging, 2014. 9: p. 1247-59.
Chin, K.Y., et al., annatto tocotrienol improves indices of bone static histomorphometry in osteoporosis due to testosterone deficiency in rats. Nutrients, 2014. 6(11): p. 4974-83.
Abdul-Majeed, S., N. Mohamed, and I.N. Soelaiman, Effects of tocotrienol and lovastatin combination on osteoblast and osteoclast activity in estrogen-deficient osteoporosis. Evid Based Complement Alternat Med, 2012. 2012: p. 960742.
Ibrahim, N., et al., Targeted delivery of lovastatin and tocotrienol to fracture site promotes fracture healing in osteoporosis model: micro-computed tomography and biomechanical evaluation. PLoS One, 2014. 9(12): p. e115595.
Wong SK, Chin KY, Suhaimi FH, Ahmad F, Ima-Nirwana S. Exploring the potential of tocotrienol from Bixa orellana as a single agent targeting metabolic syndrome and bone loss. Bone. 2018;116:8-21. Epub 2018/07/11.
Shen CL, Kaur G, Wanders D, Sharma S, Tomison MD, Ramalingam L, et al. annatto-extracted tocotrienols improve glucose homeostasis and bone properties in high-fat diet-induced type 2 diabetic mice by decreasing the inflammatory response. Scientific reports. 2018;8(1):11377. .

Tocotrienol Aids Mineralization in Fracture and MetS







Sham T3 Estrogen Control

- Prevented fracture recurrence, increased callus stiffness
- Improved trabecular bone microstructure and bone strength
- Increased osteoblast surface
- Improved metabolic syndrome parameters

70kg human equivalent dose: **680mg/day**

Chin, K.Y. and S. Ima-Nirwana, Effects of annatto-derived tocotrienol supplementation on osteoporosis induced by testosterone deficiency in rats. Clin Interv Aging, 2014. 9: p. 1247-59.
Chin, K.Y., et al., annatto tocotrienol improves indices of bone static histomorphometry in osteoporosis due to testosterone deficiency in rats. Nutrients, 2014. 6(11): p. 4974-83.
Wong SK, Chin KY, Suhaimi FH, Ahmad F, Ima-Nirwana S. Exploring the potential of tocotrienol from Bixa orellana as a single agent targeting metabolic syndrome and bone loss. Bone. 2018;116:8-21. Epub 2018/07/11.
Shen CL, Kaur G, Wanders D, Sharma S, Tomison MD, Ramalingam L, et al. annatto-extracted tocotrienols improve glucose homeostasis and bone properties in high-fat diet-induced type 2 diabetic mice by decreasing the inflammatory response. Scientific reports. 2018;8(1):11377.
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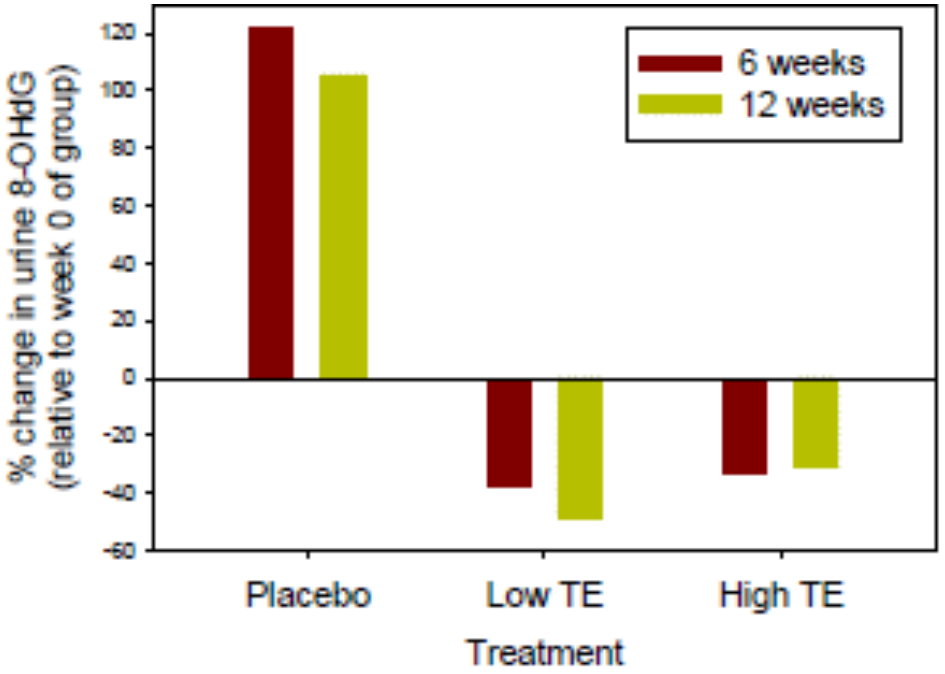
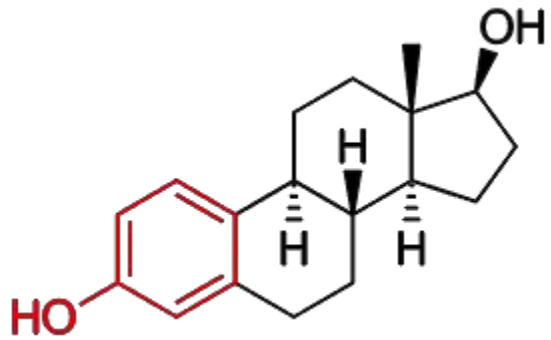
First Annatto Tocotrienol Bone Clinical Trial

- **PMW Osteopenia** in 3 treatments for 12 wks (placebo, **300mg/d** and **600mg/d**)
- Benefits to PMW at 300mg/d are:
  - Bone building (BALP/NTX) 115%↑
  - Bone resorption (sRANKL/OPG) 13%↓
  - Oxidative stress (8-OHdG) 49%↓



Obesity trial for 24 wks (placebo and **300mg/d** T3)



Aryaie, Amir, et al. "Actions of Annatto-Extracted Tocotrienol Supplementation on Obese Postmenopausal Women: Study Protocol for a Double-Blinded, Placebo-Controlled, Randomised Trial." BMJ Open, vol. 10, no. 3, 2020, doi:10.1136/bmjopen-2019-034338.
Shen CL, Yang S, Tomison MD, Romero AW, Felton CK, Mo H. Tocotrienol supplementation suppressed bone resorption and oxidative stress in postmenopausal osteopenic women: a 12-week randomized double-blinded placebo-controlled trial. Osteoporos Int. 2018.
Shen CL, Wang S, Yang S, Tomison MD, Abbasi M, Hao L, et al. A 12-week evaluation of annatto tocotrienol supplementation for postmenopausal women: safety, quality of life, body composition, physical activity, and nutrient intake. BMC complementary and alternative medicine. 2018;18(1):198.

Annatto Tocotrienol Summaries

- Annatto tocotrienol is the most potent anti-inflammatory vitamin E
- Decreases lipid oxidation and atherosclerosis in CVD
- Balances metabolites and reduces markers in CMD
- Mitigates steatosis and fibrosis in NAFLD/NASH; WC/BMI/Weight loss
- Prevents osteopenia and obesity
- Recommended Dosage (with meal)
    - Healthy: 100-300mg/day
    - Mild Chronic Condition: 300-400mg/day
    - Advanced Chronic Condition: 400-600mg/day

Thank You!

Dr. Barrie Tan, Ph. D.
barrie@american-river.com
American River Nutrition
Hadley, Massachusetts

Exclusive Live Attendee Resource Giveaway

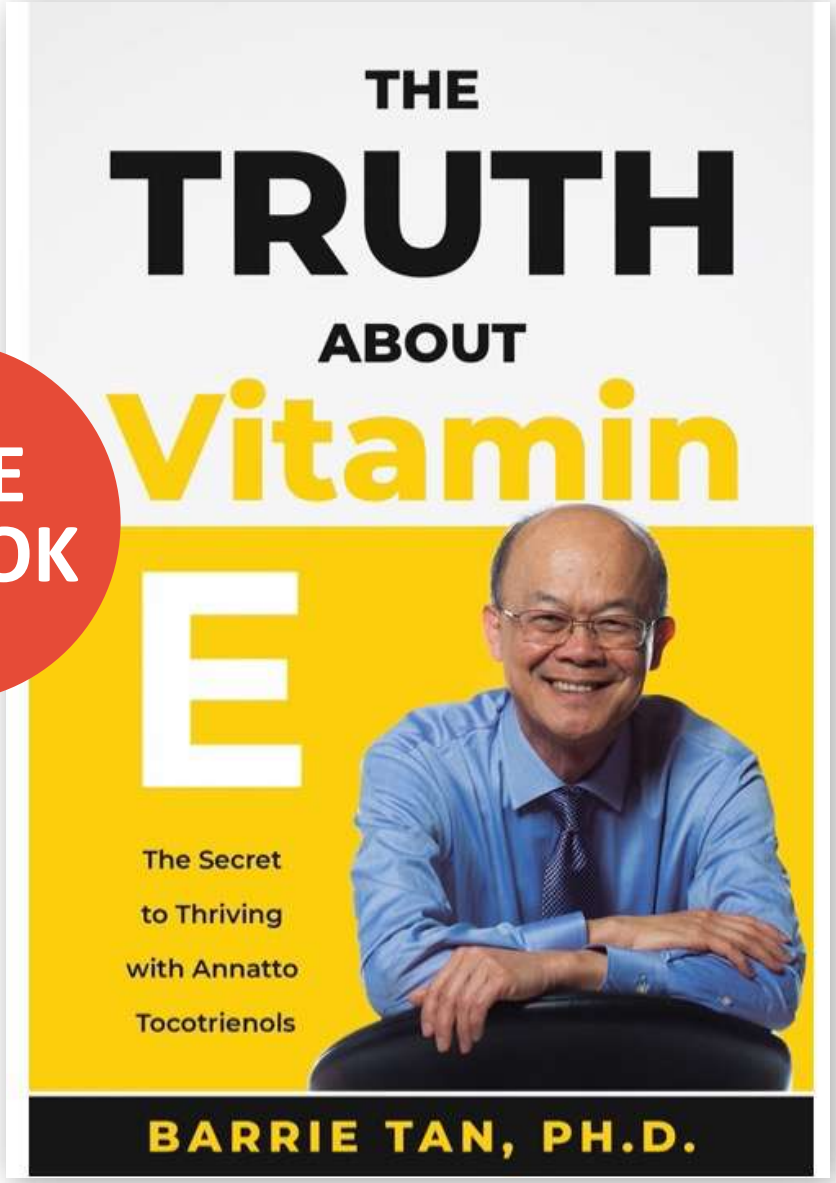
We very much value your live interaction, questions and comments and would like to thank you for attending!

We have an exclusive resource for live attendees only:

Dr Barrie Tan, Ph.D.
E-book: The Truth About Vitamin E – The Secret to Thriving with Annatto Tocotrienols

This will be emailed to you post-webinar.

FREE E-BOOK



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