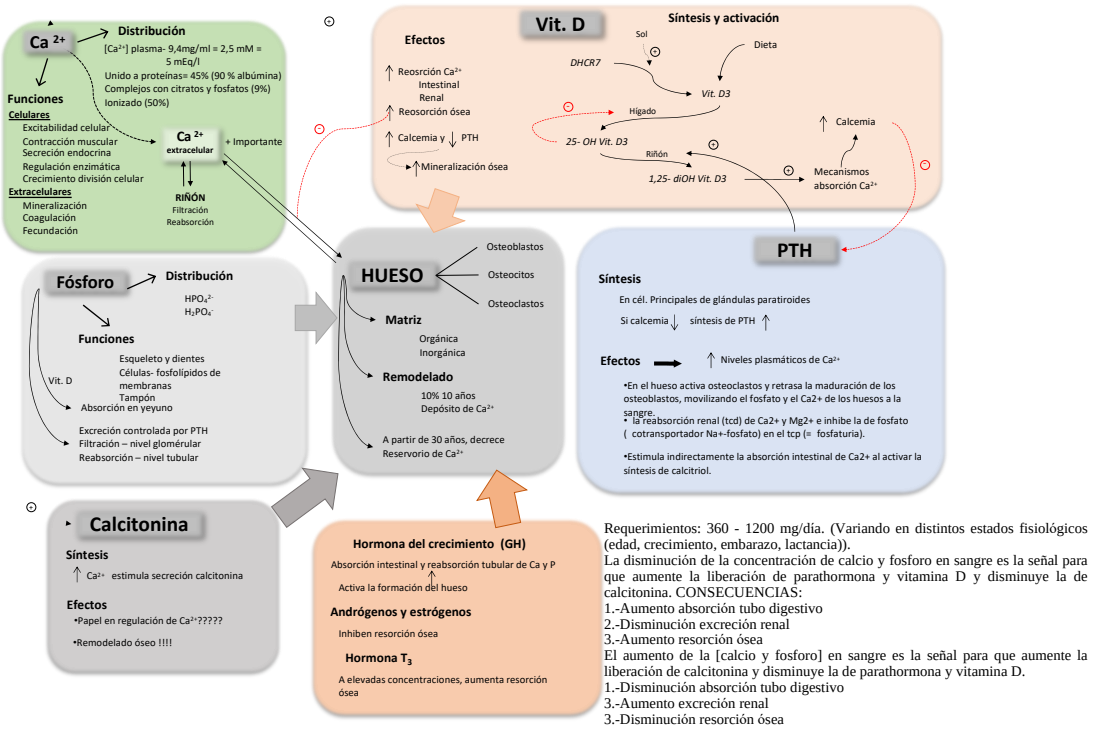


Requerimientos: 360 - 1200 mg/día. (Variando en distintos estados fisiológicos (edad, crecimiento, embarazo, lactancia)).
La disminución de la concentración de calcio y fosforo en sangre es la señal para que aumente la liberación de parathormona y vitamina D y disminuye la de calcitonina. CONSECUENCIAS:
1.-Aumento absorción tubo digestivo
2.-Disminución excreción renal
3.-Aumento resorción ósea
El aumento de la [calcio y fosforo] en sangre es la señal para que aumente la liberación de calcitonina y disminuye la de parathormona y vitamina D.
1.-Disminución absorción tubo digestivo
3.-Aumento excreción renal
3.-Disminución resorción ósea

- 7 dehidrocolesterol reductasa (DHCR7) ENZIMA QUE CATALIZA LA PRODUCCIÓN DE COLESTEROL POR MEDIO DE LA REDUCCIÓN DEL DOBLE ENLACE C7=C8 del 7 dehidrocolesterolcusando NADPH (NADPH) COMO COFACTOR. SU DÉFICIT CAUS EL SÍNDROME SLO (RETRASO MENTAL Y MALFORMACIONES) Se podrá sugerir un examen de calcitonina cuando se sospeche que tiene cáncer de tiroides medular. La calcitonina también puede ser importante en otros tumores, como los insulinomas, vipomas (cáncer de páncreas) y cáncer de pulmón.
  La calcitonina es una hormona producida en las células C de la glándula tiroides. Su papel en los hombres todavía no está claro, mientras que en los animales ayuda a regular el calcio en la sangre disminuyendo la cantidad de calcio liberado de los huesos. La calcitonina funciona en contraste con la hormona paratiroidea (PHT) y 1,25-dihidroxi vitamina D.
- Valores normales: Menos de 10 pg/ml (picogramas por mililitro).

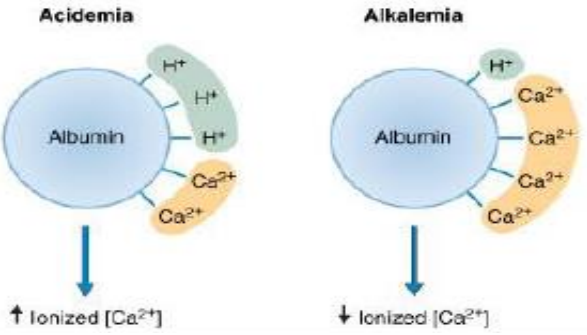
  Los niveles por encima de lo normal pueden indicar:

  Carcinoma medular de la tiroides
  Insulinoma
  Vipome
  Cáncer de pulmón

DIAGNÓSTICO DE LAS ENFERMEDADES DE LAS GLÁNDULAS PARATIROIDES
Biopsia de los paratiroides
Calcio en la orina
Calcio ionizado
Examen del calcio en la sangre
Fósforo sérico
Hormona paratiroidea
Proteína relacionada con la hormona paratiroidea

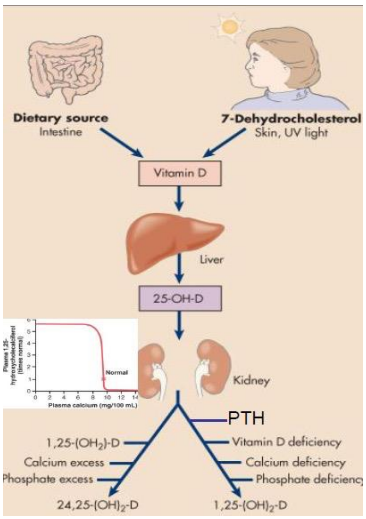
	Total	% en hueso	% extraóseo
Calcio	1000-1200 g	98-99%	1-2%
Fosfato	600-6500g	80-85%	15-20%
Mg	22-25g	60%	40%

[Ca^{2+}] normal en plasma es 9.4-10 mg/dl=2.5mM=5mEq/l



Tratamiento osteopático: A RAZONAR EN EQUIPO.

- Trabajar hígado , riñón , pulmón y equilibrar SNV.
- TRABAJAR FASCIAS DEL CUELLO.
- Dar dieta alcalina.
- Pasear un rato al Sol.
- Suplementos de Vit D sólo si pH alcalino.



Can J Cardiol. 1995 Oct;11 Suppl G:127G-131G.

Potential role of raising dietary protein intake for reducing risk of atherosclerosis.

Wolfe BM[1].

⊕ **Author information**

Abstract

OBJECTIVE: To ascertain the effect on plasma lipoprotein lipids of substituting moderate amounts of protein for carbohydrate in human diets.

DESIGN: Subjects were first stabilized on the desired fat intake for one to two weeks. Using a cross-over design, subjects were randomly allocated to either the high or low protein diet for four to five weeks and then switched to the alternative diet for four to five more weeks. Fasting venous blood was obtained weekly.

SETTING: Subjects were studied in tertiary care lipid clinic setting.

PATIENTS: Studies in two groups of hypercholesterolemic subjects have been completed: group MH - 10 subjects with moderate hypercholesterolemia (5.8 to 8.0 mmol/L) and group FH - five subjects with familial hypercholesterolemia (more than 8.2 mmol/L prior to treatment with cholestyramine). Preliminary findings in Group NL - six normolipidemic subjects (3.5 to 4.9 mmol/L) are also discussed briefly.

INTERVENTIONS: Body weight, intakes of fat, fibre and cholesterol and fat composition were constant. Either 11, 17 or 10% of total energy from protein was exchanged for carbohydrate in groups MH, FH and NL, respectively.

MAIN RESULTS: Exchange of dietary protein for carbohydrate: significantly reduced mean plasma low density lipoprotein (LDL) cholesterol 6% in group MH and 9% in group NL ($P < 0.02$); significantly increased mean fasting plasma high density lipoprotein (HDL) cholesterol by 12% in group MH and by 17% in group FH ($P < 0.01$); significantly reduced the mean value for the ratio of plasma total cholesterol to HDL cholesterol by 15% in group MH and by 16% in group FH ($P < 0.05$); and significantly reduced fasting total triglycerides by 23% in groups MH and FH and by 18% in NL ($P < 0.05$).

CONCLUSION: Substitution of dietary protein for carbohydrate favourable alters human blood cholesterol cardiovascular risk profiles.

En relación al metabolismo del calcio:

Es fundamental considerar que las proteínas son tampones intracelulares.

Por ello un moderado incremento de la proteína diaria (10-20% de la energía) puede incrementar ligeramente la absorción de calcio e una dieta pobre en calcio compensando prácticamente el ligero aumento de la excreción de calcio.

Un incremento excesivo de proteína(40%) descalcifica porque utilizas el calcio para tamponar el ácido.

Am.J. Clin Nutr 2009.

No puedo reducir la proteína de mi dieta. Aunque exceso de 40% de proteína, por acidosis, me descalcifica.

See 1 citation found using an alternative search:

J Acad Nutr Diet. 2014 Jan;114(1):72-85. doi: 10.1016/j.jand.2013.08.021. Epub 2013 Oct 30.

Diet-induced weight loss: the effect of dietary protein on bone.

Tang M, O'Connor LE, Campbell WW.

Abstract

High-protein (>30% of energy from protein or >1.2 g/kg/day) and moderately high-protein (22% to 29% of energy from protein or 1.0 to 1.2 g/kg/day) diets are popular for weight loss, but the effect of dietary protein on bone during weight loss is not well understood. Protein may help preserve bone mass during weight loss by stimulating insulin-like growth factor 1, a potent bone anabolism stimulator, and increasing intestinal calcium absorption. Protein-induced acidity is considered to have minimal effect on bone resorption in adults with normal kidney function. Both the quantity and predominant source of protein influence changes in bone with diet-induced weight loss. Higher-protein, high-dairy diets may help attenuate bone loss during weight loss.

KEYWORDS: Adults; Bone; Dietary protein; High-protein diet; Weight loss

PMID: 24183993 DOI: 10.1016/j.jand.2013.08.021

[Indexed for MEDLINE]

Calcio:

Se distribuye en 99% por huesos y dientes y en sangre y tejidos blandos un 1%.

Interviene en la mineralización de huesos , dientes, en el control del tono arterial, en la contracción muscular, el la coagulación, en la secreción de hormonas, en la conducción nerviosa, en la sensibilidad a la insulina, en la lipólisis, en la vc, TA y coagulación.

¿qué aumenta la absorción de calcio?

- Hormonas esteroideas.
- Hormona del crecimiento.
- La acidez gástrica.
- La vit C.
- La lisina.
- La glicina.
- La Vit D3.
- La fibra soluble .
- La lactosa (sólo en niños).

¿ qué disminuye la absorción de calcio?

1.-Grasas.
2.-Un aumento de la relación Fósforo/ Calcio mayor de 1.5 .
3.-Exceso de sodio , de potasio, de magnesio o de estroncio (el estroncio se encuentra en concentraciones relativamente altas de las especias, granos enteros, vegetales de hojas verdes como la espinaca y la col, mariscos, vegetales de raíz como las zanahorias y nabos, y legumbres como los frijoles, las lentejas y los guisantes).

- **Cantidad recomendada** La cantidad de estroncio ingerida por una dieta saludable suelen ser suficientes para el desarrollo humano. Si tiene osteoporosis, se recomienda tomar un suplemento de estroncio)

4.- Ácido fítico (cereales(salvado), legumbres, soja , semillas, oleaginosas)
5. -Ácido Oxálico (espinacas, ruibarbo, cacao en polvo, chocolate negrofrutos secos, judías, cereales integrales, batata, cacao y café). Espárragos, tomate , higo, té , ciruelas , manzanas (desaparece si desechas el agua de cocción)

EL ESTRONCION ES MUY SIMILAR AL CALCIO Y ES INCORPORADO AL HUESO. LAS FORMAS ESTABLES NO RADIACTIVAS NO PROVOCAN EFECTOS ADVERSOS SIGNIFICATIVOS EN LA SALUD, LAS RADIOACTIVAS SE HAN RELACIONADO CON EL CANCER ÓSEO. EL RANELATO DE ESTRONCIO HA MOSTRADO EFECTOS EN EL CRECIMIENTO ÓSEO. El ácido oxálico es un quelante de de minerales como cacio , hierro, magnesio , cobre y zinc

¿ qué aumenta la excreción de calcio?

- El alcohol.
- El exceso de sodio.
- La glucosa.
- La hiperinsulinemia.
- Dietas con exceso de proteína.

Biodisponibilidad del calcio:

- La biodisponibilidad de calcio es mayor en las verduras, brásicas y frutos secos que en los lácteos (por los fosfatos y el pH)
- Las brásicas son una anomalía en la naturaleza de los vegetales , pues no acumulan oxalatos para desintoxicar el exceso de calcio que a otras plantas les causa la muerte celular (pej: espinacas) y tienen una excelente absorción frente a las espinacas cuya absorción es pésima.
- El pescado plactocnívoro es una fuente de calcio de elevada biodisponibilidad.
- Las semillas de sésamo, chia , la col, las almendras , el kelp, el brócoli… son fuentes ricas en calcio de mayor a menor cantidad.

Am J Clin Nutr. 2007 Dec;86(6):1780-90.

Calcium intake and hip fracture risk in men and women: a meta-analysis of prospective cohort studies and randomized controlled trials.

Bischoff-Ferrari HA[1], Dawson-Hughes B, Baron JA, Burckhardt P, Li R, Spiegelman D, Specker B, Orav JE, Wong JB, Staehelin HB, O'Reilly E, Kiel DP, Willett WC.

Author information

Abstract

BACKGROUND: The role of total calcium intake in the prevention of hip fracture risk has not been well established.

OBJECTIVE: The objective of the study was to assess the relation of calcium intake to the risk of hip fracture on the basis of meta-analyses of cohort studies and clinical trials.

RESULTS: In women (7 prospective cohort studies, 170,991 women, 2,954 hip fractures), there was no association between total calcium intake and hip fracture risk [pooled risk ratio (RR) per 300 mg total Ca/d = 1.01; 95% CI: 0.97, 1.05]. In men (5 prospective cohort studies, 68,606 men, 214 hip fractures), the pooled RR per 300 mg total Ca/d was 0.92 (95% CI: 0.82, 1.03). On the basis of 5 clinical trials (n = 5666 women, primarily postmenopausal, plus 1074 men) with 814 nonvertebral fractures, the pooled RR for nonvertebral fractures between calcium supplementation (800–1600 mg/d) and placebo was 0.92 (95% CI: 0.81, 1.05). On the basis of 4 clinical trials with separate results for hip fracture (6,504 subjects with 139 hip fractures), the pooled RR between calcium and placebo was 1.64 (95% CI:1.02, 2.64). Sensitivity analyses including 2 additional small trials with <100 participants or per-protocol results did not substantially alter results.

CONCLUSIONS: Pooled results from prospective cohort studies suggest that calcium intake is not significantly associated with hip fracture risk in women or men. Pooled results from randomized controlled trials show no reduction in hip fracture risk with calcium supplementation, and an increased risk is possible. For any nonvertebral fractures, there was a neutral effect in the randomized trials.

J Clin Hypertens (Greenwich). 2017 Jun;19(6):640-646. doi: 10.1111/jch.13010. Epub 2017 May 2.

Calcium supplementation and cardiovascular risk: A rising concern.

Tankeu AT[1], Ndip Agbor V[2], Noubiap JJ[3].

⊕ Author information

Abstract

Over the past decade, the number of individuals taking calcium supplementation worldwide has been on the rise, especially with the emergence of new pharmaceutical companies specialized in the marketing of dietary supplements; with calcium supplementation being their main business axis. This is mostly because of the established role of calcium in the prevention and treatment of osteoporosis and, to a lesser extent, its role in the prevention of fractures. Recently, a rising body of evidence on the adverse effect of calcium supplementation on nonskeletal, especially cardiovascular, health has been a cause for concern. In fact, a significant number of studies have reported an association between calcium supplementation and adverse cardiovascular events, even though high dietary calcium intake was shown to have a protective effect. The mechanism by which calcium supplementation could cause a cardiovascular event was still unclear until a recent study published in the Journal of the American Heart Association. Combining this recent finding with available data associating calcium supplementation with cardiovascular mortality and all-cause mortality, we call on the need for an evidence-based approach to calcium supplementation, while stressing on the safety of dietary calcium intake over the former on cardiovascular health.

KEYWORDS: calcium; cardiovascular disease; supplementation

Med Monatsschr Pharm. 2016 Jun;39(6):236-44; quiz 245-6.

[Nutrition and bone health: What ist the evidence?].

[Article in German]

Ströhle A, Hahn A.

Abstract

Nutrients are of particular importance for bone health: they act as structural elements of bones, modulate the activity of osteoblasts and osteoclasts, and influence bone remodeling through various mediators. A bone protective diet can be characterised as a diet rich in fruits and vegetables, dairy products, seeds and nuts, whole grain and soy products and moderate amounts of fish, eggs and lean meat. This diet provides sufficient amounts of protein, calcium, magnesium and vitamins (e. g. K, C, folic acid, B6 and B12), which are important for bone development. For specific nutrients, the following bone-protective recommendations can be given: 1.0-1.3 g protein/kg body weight and day; 1000-1200 mg/day calcium, preferably as part of the normal diet. In case of insufficient calcium intake or on antiresorptive medication a supplementation of 200-500 mg or 500-1000 mg calcium/day, respectively, should be given. Furthermore, for prevention of bone fractures a cut off level of ≥ 75 nmol calcidiol/l is suggested.

PMID: 27439256

[Indexed for MEDLINE]

Arch Endocrinol Metab. 2016 Jun;60(3):252-63. doi: 10.1590/2359-3997000000173.

Calcium intake: good for the bones but bad for the heart? An analysis of clinical studies.

Lima GA[1,2], Lima PD[2,3], Barros Mda G[3,4], Vardiero LP[3], Melo EF[3], Paranhos-Neto Fde P[1], Madeira M[1,5], Farias ML[1].

⊕ Author information

Abstract

The proper dietary calcium intake and calcium supplementation, when indicated, are important factors in the acquisition of peak bone mass during youth and in the prevention of fractures in old age. In addition to its deposition in bone, calcium confers an increase in its resistance and exhibits important activities in different enzymatic pathways in the body (e.g., neural, hormonal, muscle-related and blood clotting pathways). Thus, calcium supplementation can directly or indirectly affect important functions in the body, such as the control of blood pressure, plasma glucose, body weight, lipid profile and endothelial function. Since one publication reported increased cardiovascular risk due to calcium supplementation, many researchers have studied whether this risk actually exists; the results are conflicting, and the involved mechanisms are uncertain. However, studies that have evaluated the influence of the consumption of foods rich in calcium have reported no increase in the cardiovascular risk, which suggests that nutritional intake should be prioritized as a method for supplementation and that the use of calcium supplements should be reserved for patients who truly need supplementation and are unable to achieve the recommended daily nutritional intake of calcium.

PMID: 27355855 DOI: 10.1590/2359-3997000000173

Geriatr Psychol Neuropsychiatr Vieil. 2016 Jun 1;14(2):127-34. doi: 10.1684/pnv.2016.0599.

Effect of vitamin D on skeletal muscle.

Walrand S[1].

⊕ Author information

Abstract

Beyond its traditional biological roles on bone health, extra-skeletal effects of vitamin D are currently under extensive research. The expression of the vitamin D receptor in most tissues has also strengthened the argument for its multiple functions. Among these, the effect of vitamin D on the mass and muscle performance has long been discussed. In ancient Greece, Herodotus recommended the sun as a cure for the "weak and soft muscles" and former Olympians exposed to sunlight to improve their physical performance. In 1952, Dr Spellerberg, a sports physiologist, has conducted an extensive study on the effects of UV irradiation on the performance of elite athletes. Following the significant results of this investigation, the scientist has informed the Olympic Committee that UV irradiation had a "persuasive" effect on physical performance and motor skills. These data are consistent with many subsequent studies reporting an improvement in physical activity, speed and endurance in young subjects treated with UV or with supplements containing vitamin D. Additional observation indicates a significant effect on muscle strength, particularly in the lower limbs. Concerning the mechanisms involved, some recent fundamental studies have shown that vitamin D exerts some molecular effects within the muscle cell. Specifically, a regulatory effect of vitamin D on calcium flux, mineral homeostasis and signaling pathways controlling protein anabolism has been reported in muscle tissue. Several epidemiological studies show that low vitamin D status is always associated with a decrease in muscle mass, strength and contractile capacity in older people. Vitamin D deficiency accelerates muscle loss with age (sarcopenia), and therefore leads to a reduction in physical capacity and to an increased risk of falls and fractures. In contrast, an additional intake of vitamin D in older people significantly improves muscle function and physical performance.

KEYWORDS: older people; sarcopenia; skeletal muscle; vitamin D

Effect of calcium supplements on risk of myocardial infarction and cardiovascular events: meta-analysis.

Bolland MJ[1], Avenell A, Baron JA, Grey A, MacLennan GS, Gamble GD, Reid IR.

⊕ Author information

Abstract

OBJECTIVE: To investigate whether calcium supplements increase the risk of cardiovascular events.

DESIGN: Patient level and trial level meta-analyses.

DATA SOURCES: Medline, Embase, and Cochrane Central Register of Controlled Trials (1966-March 2010), reference lists of meta-analyses of calcium supplements, and two clinical trial registries. Initial searches were carried out in November 2007, with electronic database searches repeated in March 2010.

STUDY SELECTION: Eligible studies were randomised, placebo controlled trials of calcium supplements (>or=500 mg/day), with 100 or more participants of mean age more than 40 years and study duration more than one year. The lead authors of eligible trials supplied data. Cardiovascular outcomes were obtained from self reports, hospital admissions, and death certificates.

RESULTS: 15 trials were eligible for inclusion, five with patient level data (8151 participants, median follow-up 3.6 years, interquartile range 2.7-4.3 years) and 11 with trial level data (11 921 participants, mean duration 4.0 years). In the five studies contributing patient level data, 143 people allocated to calcium had a myocardial infarction compared with 111 allocated to placebo (hazard ratio 1.31, 95% confidence interval 1.02 to 1.67, P=0.035). Non-significant increases occurred in the incidence of stroke (1.20, 0.96 to 1.50, P=0.11), the composite end point of myocardial infarction, stroke or sudden death (1.18, 1.00 to 1.39, P=0.057), and death (1.09, 0.96 to 1.23, P=0.18). The meta-analysis of trial level data showed similar results: 296 people had a myocardial infarction (166 allocated to calcium, 130 to placebo), with an increased incidence of myocardial infarction in those allocated to calcium (pooled relative risk 1.27, 95% confidence interval 1.01 to 1.59, P=0.038).

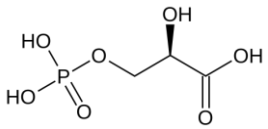
CONCLUSIONS: Calcium supplements (without coadministered vitamin D) are associated with an increased risk of myocardial infarction. As calcium supplements are widely used these modest increases in risk of cardiovascular disease might translate into a large burden of disease in the population. A reassessment of the role of calcium supplements in the management of osteoporosis is warranted.

4.- PROCEDENCIA DEL DOLOR EN LAS LESIONES DEL TEJIDO CONECTIVO

3 fosfoglicerato :

Residuo derivado de la

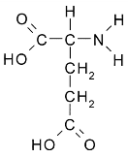
glucosa en el ciclo de Krebs

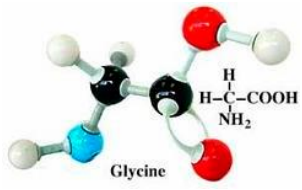


Coenzima nicotin adenin dinucleótido fosfato.

Transferencia de electroens y protones .

Reducción: NAD+ A NADH





GLUTAMATO : aminoácido excitador por excelencia

en cerebro y nocicepción tendón.

Por mediación del cetoglutarato pasa a FOSOFOGLICERAMONIO y mediante la fosfoserín fosfatasa pasa a SERINA que mediante la serina hidroxietil-transferasa pasa a GLICINA.

ANÁLISIS DE SANGRE

COLÁGENO -RESISTENCIA

La hidroxilación de la Prolina da estabilidad a la molécula de colágeno al favorecer la formación de puentes de hidrógeno y otros enlaces iónicos

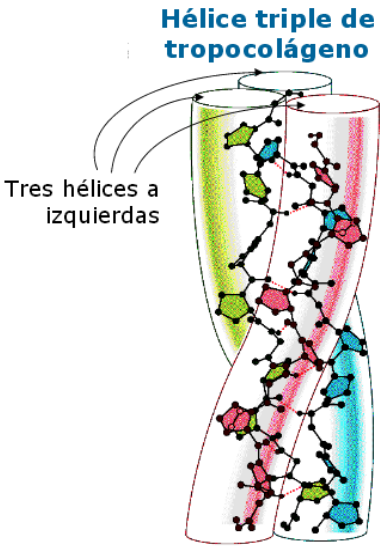
Esto da más estabilidad y mayor temperatura de fusión a la molécula.

Para ello es necesario la Vitamina C.

- Un hombre de 70 kg debería consumir entre 1,22 y 1,47 g de ácido ascórbico diariamente para fabricar 924 g de colágeno que es la cantidad (25% del total) renovable por día. Con este procedimiento puede calcularse, por ejemplo, que una mujer de 55 kg necesita entre 0,95 y 1,15 g de vitamina C, y un niño de 25 kg necesita entre 436 y 525 mg de vitamina C diariamente. Como vemos, estos resultados se alejan mucho de las recomendaciones de la OMS y de la FAO que recomiendan entre 20 y 28 veces menos para un adulto: Es obvio que esa estimación no ha tenido en cuenta la bioquímica del colágeno.

Colágeno:

- Proteína más abundante de los vertebrados
- Red fibrosa de tropocolágeno
- Tropocolágeno
  - –Abundancia de Pro y Gly
    - Secuencia G-X-Y
      - –X e Y suelen ser Pro e hidroxi-Pro
      - –En Y también abunda hidroxi-Lys
  - –Triple hélice a derechas formada por tres hélices a izquierdas
    - Enlaces de H interhélice
    - Gly, uno de cada tres residuos, en la zona de empaquetamiento
- Entrecruzamiento de unidades de tropocolágeno
  - –Por derivados aldehído de Lys



Estabilidad del colágeno:

- Secuencia G-X_Y → si Gly- Pro-Pro→ Tª fusión 24ºC. Si Gly-Hidroxipro-Pro → Tª fusión 39ºC.
- Tipos de enlaces intermoleculares más importantes:
- 1.- Puentes de hidrógeno : gracias a la hidroxilación de la prolina y lisina.
- 2.- Enlaces covalentes : entre cisteínas , entre moléculas de tropocolágeno.
- HLNL
- DHLN