Welcome to Optimal Bone Health

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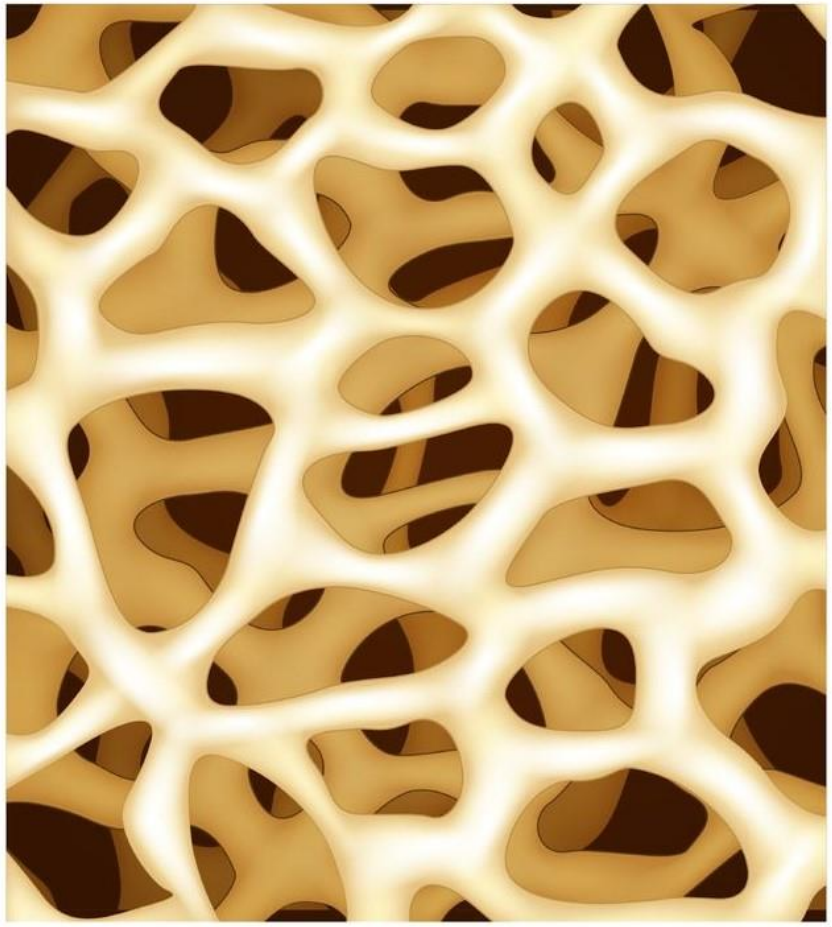
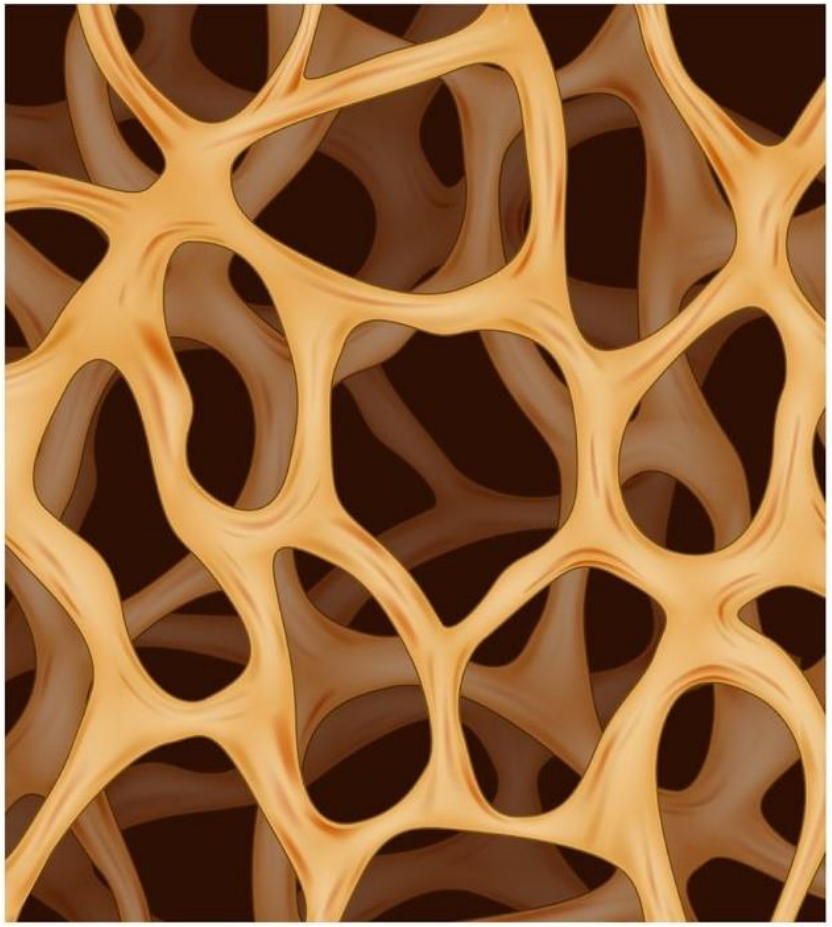
Presenter Disclosure Information

I will not discuss off-label use or investigational use of prescription drugs in my presentation.

MINNESOTA PERSONALIZED MEDICINE



Normal Bone



Bone with Osteoporosis

Specifically, I hope that you will:

- recognize that the living matrix we call bone is much more than calcium/mineral density
- understand three nutritional factors for healthy bone beyond calcium that also have anti-cancer activity
- identify three bone building strategies that can be easily integrated into daily life

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Evista (Raloxifene)

- a selective estrogen receptor modulator (SERM)

- FDA approved for postmenopausal women:

  a) to treat and prevent osteoporosis

  b) to reduce the risk of hormone-receptor-positive breast cancer

Bisphosphonates

- Fosamax (alendronate sodium)
- Actonel (risedronate)
- Boniva (ibandronate)
- Bonefos (clodronate) (67 countries)
- Reclast (zoledronic acid)

- Zometa (zoledronic acid)

Early Breast Cancer Trialists' Collaborative Group (EBCTCG)

Bisphosphonate therapy:

a) reduces the rate of breast cancer recurrence.

b) improves breast cancer survival.

Lancet. 2015 Oct 3;386(10001):1353-1361.

11,767 postmenopausal women

- recurrence (RR 0·86, 95% CI 0·78-0·94; 2p=0·002),
- distant recurrence (0·82, 0·74-0·92; 2p=0·0003),
- bone recurrence (0·72, 0·60-0·86; 2p=0·0002)
- breast cancer mortality (0·82, 0·73-0·93; 2p=0·002)

Lancet. 2015 Oct 3;386(10001):1353-1361.

Bisphosphonates

- Esophageal irritation
- Atypical femur fractures (after 5 years)
- Renal insufficiency concerns
- Osteonecrosis of the jaw concerns

Denosumab (Prolia, Xgeva)

- FDA approved to:

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a) Treat osteoporosis in women who are at high risk of breaking a bone or who can't take or have not benefitted from other osteoporosis treatments

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a) Treat osteoporosis in women who are at high risk of breaking a bone or who can't take or have not benefitted from other osteoporosis treatments

b) Reduce the risk of bone complications and bone pain caused by advanced-stage breast cancer that has spread to the bone

“Fundamentals First,

Then,

Pharmaceuticals.”

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Please think of your bones as
a coral reef

Multiple vitamin deficiencies additively increase the risk of incident fractures

- 25-hydroxyvitamin D (25(OH)D),
- Homocysteine,
- Undercarboxylated osteocalcin

Osteoporos Int. 2019 Mar;30(3):593-599

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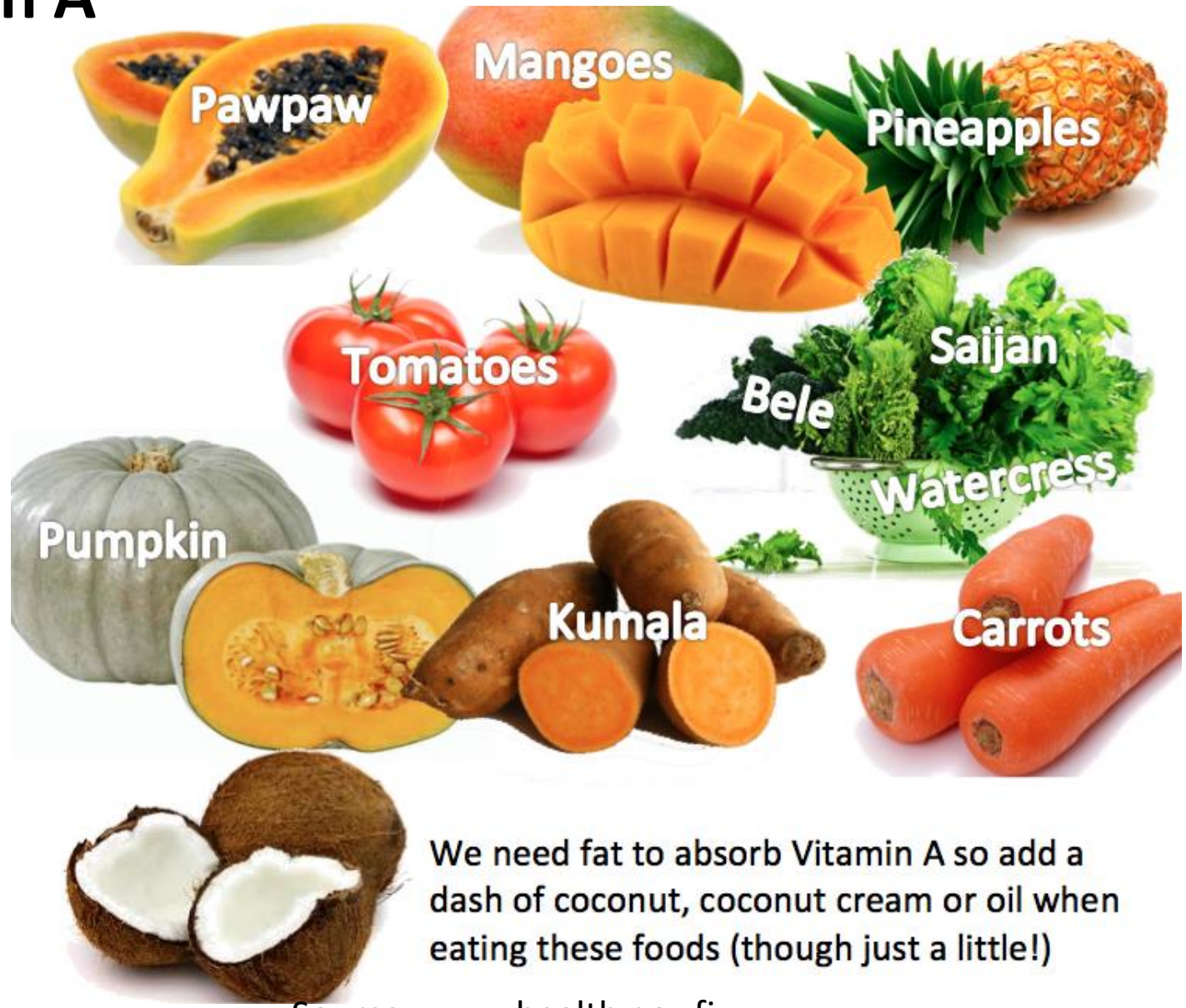
Vitamin D

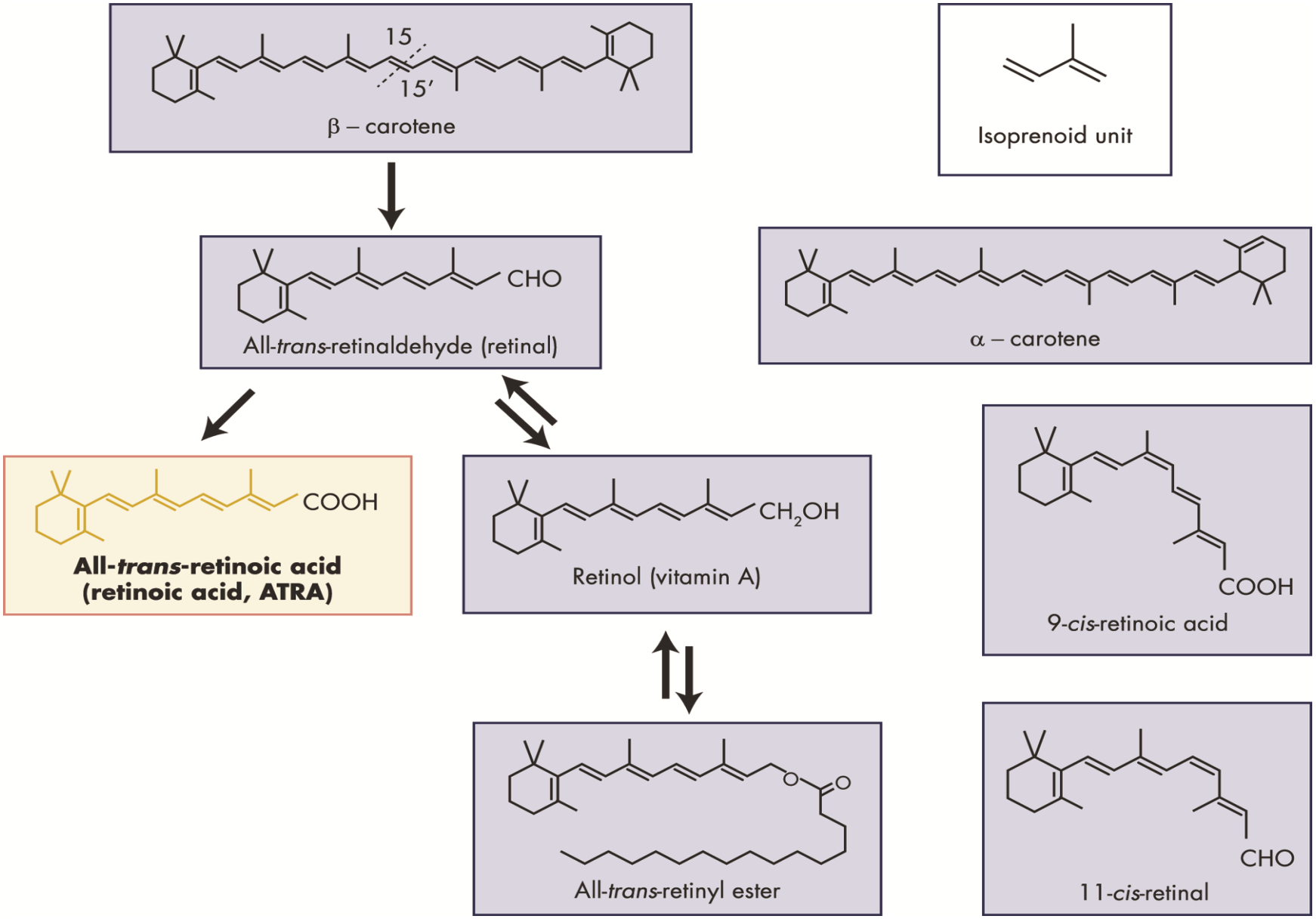
Figure 2. Radiologic image of nutritional rickets.

Endocrine Reviews, Volume 40, Issue 4, August 2019, Pages 1109–1151, https://doi.org/10.1210/er.2018-00126

Vitamin A



Source: www.health.gov.fj



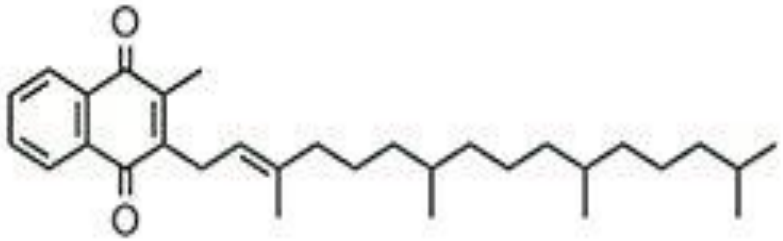
Endocrine Reviews, Volume 34, Issue 6, 1 December 2013, Pages 766–797, https://doi.org/10.1210/er.2012-1071

Vitamin K

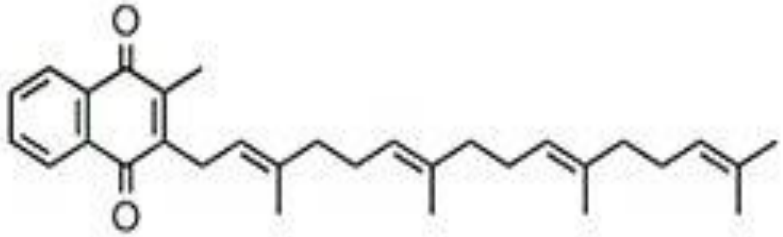
Source: https://calciumvitaminsupplements.wordpress.com/2016/06/09/7-supplements-for-bones/

Forms of Vitamin K

K1



MK-4



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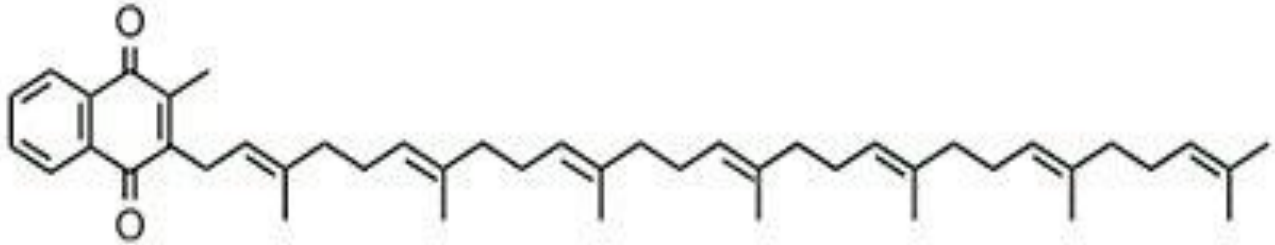
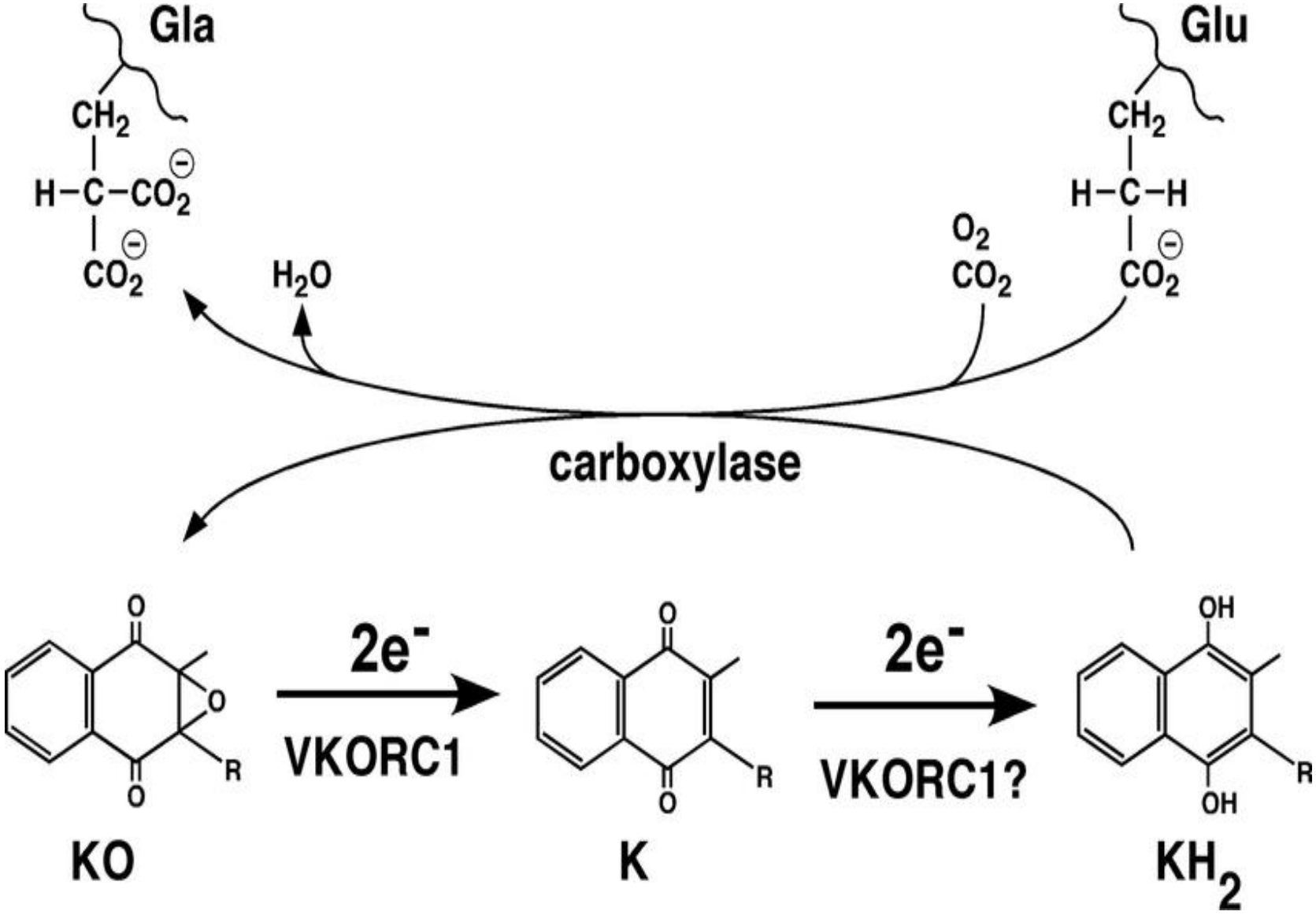
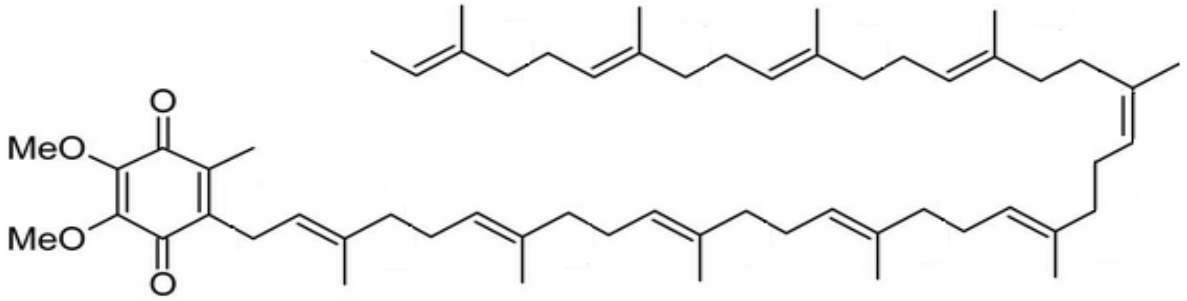


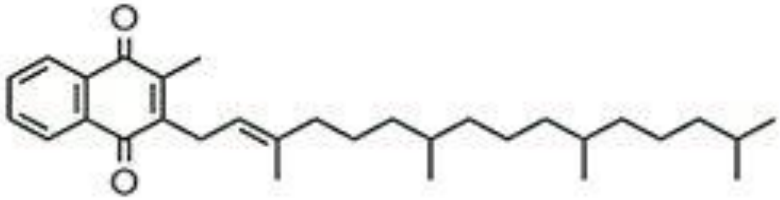


Rishavy MA et al. The Journal of Biological Chemistry. 2013; 288(44): 31556-66.



Co Enzyme Q10 (CoQ10)

K1



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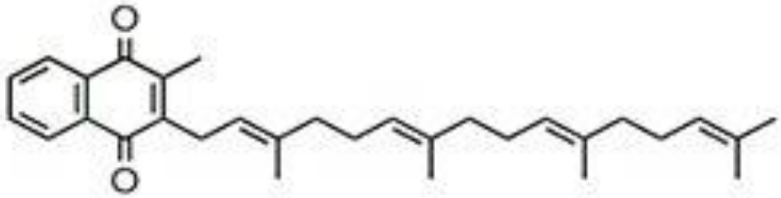

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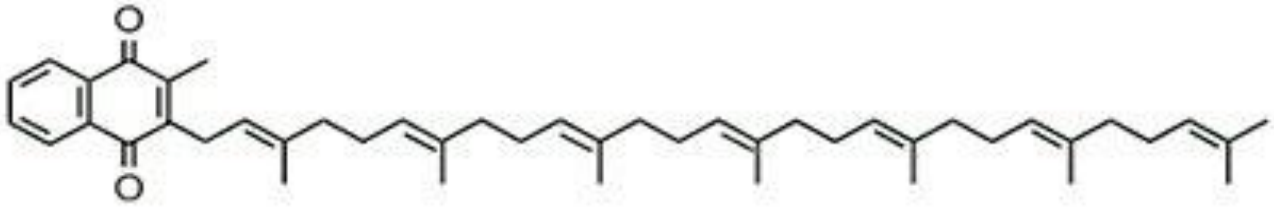


Vitamin K-dependent proteins are located within the bone, heart and blood vessels.

- **Carboxylated osteocalcin :** calcium into the bone matrix.
- **Periostin:** promotes the differentiation, aggregation, adhesion and proliferation of osteoblasts.

- **Carboxylated matrix Gla protein:** protects blood vessels
- **Carboxylated Gla-rich protein:** inhibits CV calcification
- **GAS-6:** inhibits the calcification of blood

Vitamin K vs. Cancer

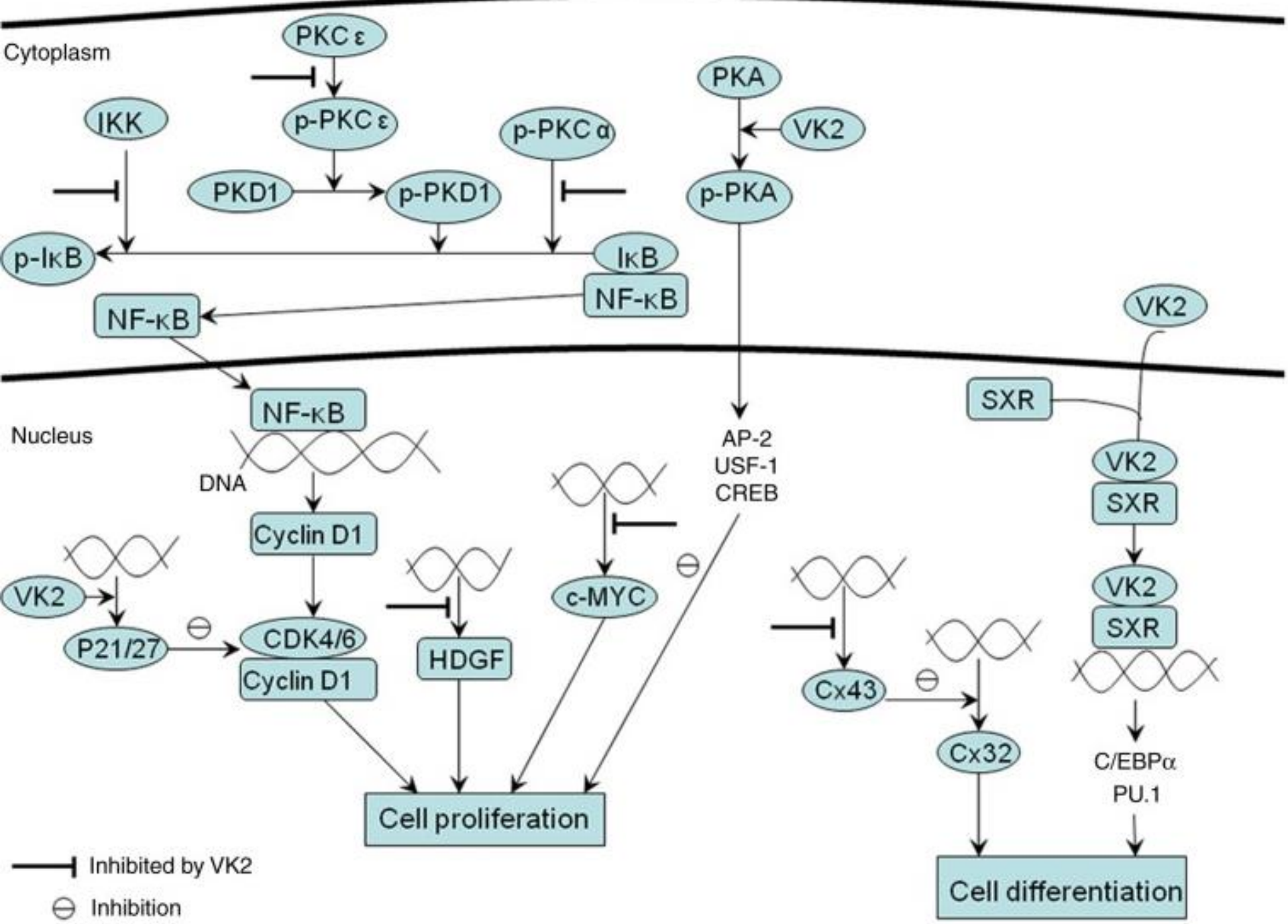
Mitchell JS, Simon-Reuss I. Nature. 1947; 159 (4055): 98.

- Breast
- Stomach
- Liver
- Prostate
- Leukemia

VK Suppression of Cancer

- Induces cell cycle arrest
- Induces cell differentiation
- Induces apoptosis
- Induces autophagy

- Tokita H et al. Int J Mol Med. 2006; 17:235-243.
- Miyazawa K et al. Leukemia. 2001; 15: 1111-1117.
- Enomoto M et al. Int J Mol Med. 2007; 20:801-808.
- Tsujioka T et al. Haematologica. 2006; 91: 613-619.
- Karasawa S et al. Mol Pharmacol. 2013; 83:613-620.
- Yokoyama T et al. Autophagy. 2008; 4: 629-640.



Xv F et al. Oncol Lett. 2018 Jun; 15(6): 8926–8934

Prior administration of vitamin K2 improves the therapeutic effects of zoledronic acid in ovariectomized rats by antagonizing zoledronic acid-induced inhibition of osteoblasts proliferation and mineralization.

Zhao B et al. PLoS One. 2018 Aug 20;13(8):e0202269.

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Step One: Nutrition

- Check your blood levels of:
  - vitamin A,
  - vitamin D,
  - homocysteine
- Ensure adequate Vitamin D/K combination supplementation
- Consider blood testing for gluten sensitivity
- Ensure sufficient protein intake
- Ensure sufficient calcium intake

Step Two: Exercise

www.timeasia.com JULY 21, 2003

TIME

Secrets of Asian Longevity

The latest science on how to live longer, healthier and happier

Step Three: Assess Your Stressors

The Five Forms of Stress

- Environmental
- Physical
- Emotional/Spiritual
- Pharmaceutical
- Dietary

Catabolic

Cortisol

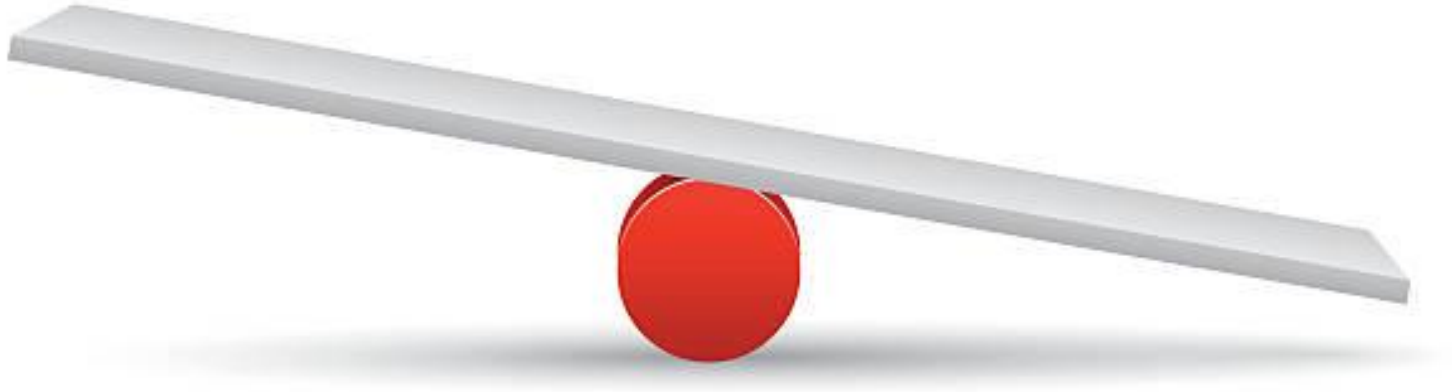
Rx Steroids

Anabolic

DHEAS

Androgens

Estrogens



Thank you!

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