



Calcium Supplementation

Yes/NO



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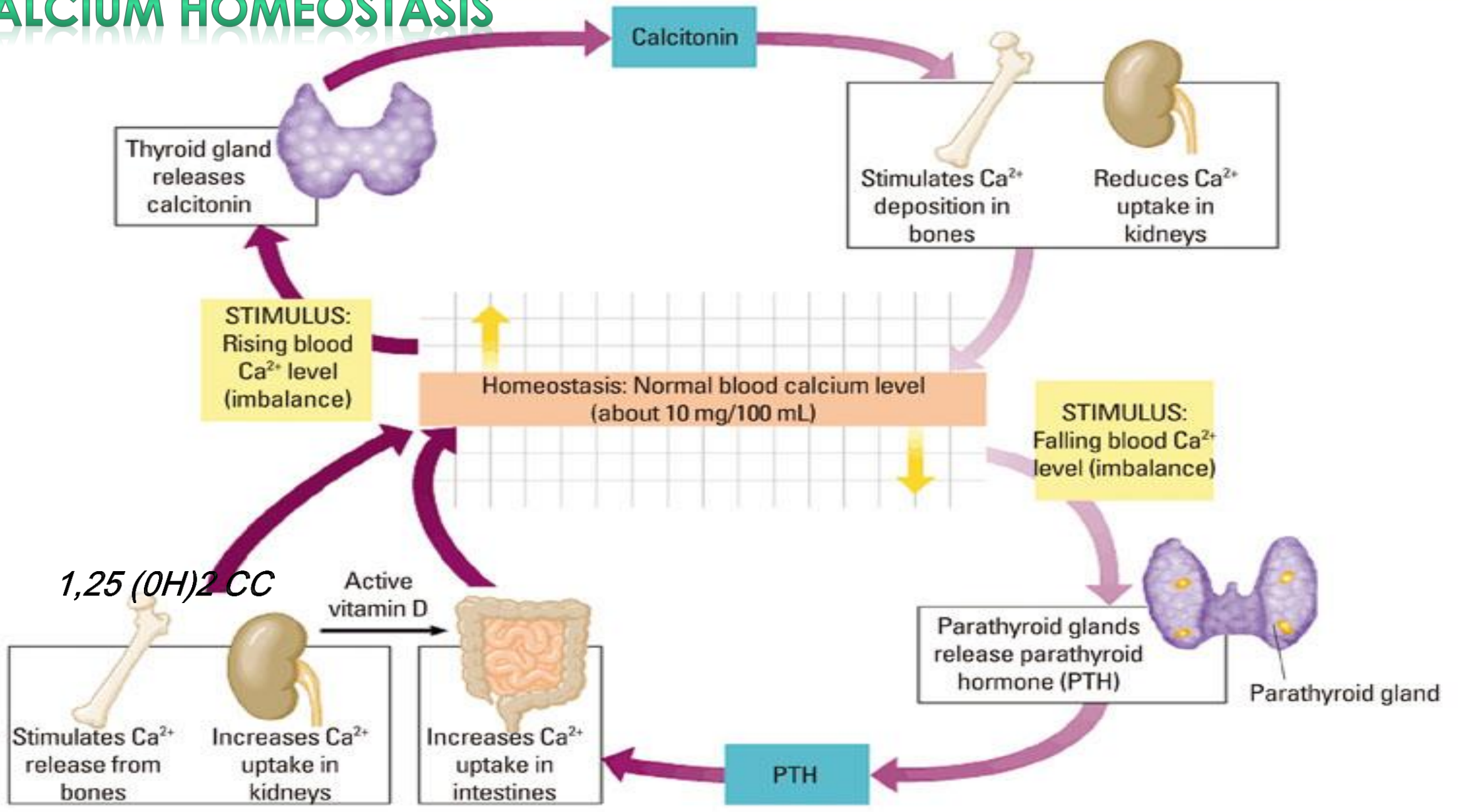
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DEPT OF MEDICINE, DMCH

Calcium and Health

- ➔ Calcium is an essential mineral which plays important roles in nerve conduction, muscle contraction, and blood clotting .
- ➔ Ninety-nine percent of all the calcium in the body is found in the bones and teeth.
- ➔ The remaining one percent is in the blood.
- ➔ If calcium levels in the blood drop below normal, calcium will be taken from bone and put into the blood in order to maintain blood calcium levels.

CALCIUM HOMEOSTASIS



❑ Insufficient Calcium & Osteoporosis

- ❑ Insufficient calcium intake will cause bone loss leading to osteoporosis and life-threatening fractures.
- ❑ Sometimes, insufficient calcium can accelerate atherosclerosis by causing excess removal of calcium from bone into the bloodstream where it calcifies arteries.

Osteoporosis and calcium:

- *Osteoporosis, which is especially prevalent among older postmenopausal women, increases the risk of fractures.*
- Major risk factors for osteoporosis include:
 - advanced age,
 - genetics,
 - lifestyle factors (such as low calcium and vitamin D containing food intake, smoking),
 - thinness, and
 - menopause status.
- The most common risk factors for osteoporotic fracture are advanced age, low bone mineral density, and previous fracture as an adult.



Calcium is available in “ionic state” in natural sources, e.g. food & coral calcium

Ionic calcium ensures :

- ❖ Faster dissolution
- ❖ Better absorption
- ❖ Effective bone mineralization

So Serum calcium should be maintained by dietary sources not from supplemental calcium salt tablets.

How much calcium do we need:

Age	Milligram (mg)/day (minimum calcium intake)	Tolerable Upper Intake Level (Upper Limit) mg/day
Children	800	2500
Adolescents	1300	3000
Adult Males and Females 19 - 50 years old	1000	2500
Adult Females 51 - 70 years old	1200	2000
Pregnancy and Lactation	1300	3000

How much calcium is too much:

It is recommended that we should not take more than the tolerable upper intake level of calcium per day.

High calcium intake can lead to

- constipation,
- an increased chance for developing calcium kidney stones,
- and may inhibit the absorption of iron and zinc from food.

Some good food sources of calcium are:

- ▶ Milk & yogurt
- ▶ Cheese
- ▶ Bones in canned sardines and Salmon
- ▶ Calcium fortified foods (i.e., orange juice, soy milk)
- ▶ Dark green, leafy vegetables

Management focuses

first on non-pharmacologic measures: such as :

- ✓ balanced diet, adequate calcium and vitamin D intake,
- ✓ adequate exercise, smoking cessation, avoidance of excessive alcohol intake

If pharmacologic therapy is indicated, options are

- ❖ bisphosphonates,
- ❖ selective estrogen-receptor modulators,
- ❖ parathyroid hormone,
- ❖ estrogens,
- ❖ and calcitonin.

Calcium and vitamin D have limited efficacy in the prevention of osteoporotic fractures when given in isolation but are widely used as an adjunct to other treatments.

What increases calcium absorption:

- The calcium is consumed is absorbed by the body in the small intestine.
- Not all the calcium is eaten will be absorbed,
- some will pass through the body and be excreted as waste.

How much calcium is absorbed by the body depends on

- ✓ the type of calcium is consumed,
- ✓ how well the calcium dissolves in the intestines,
- ✓ and the amount of calcium in the body.

CALCIUM SUPPLEMENT

- The calcium in a compound is called elemental calcium.
- If a tablet contains 500 milligrams of calcium carbonate, it contains **only 200 milligrams of elemental calcium**. This is because only **40% of the calcium compound is elemental calcium**. The other 60%, or 300 milligrams, would be from the carbonate ingredient

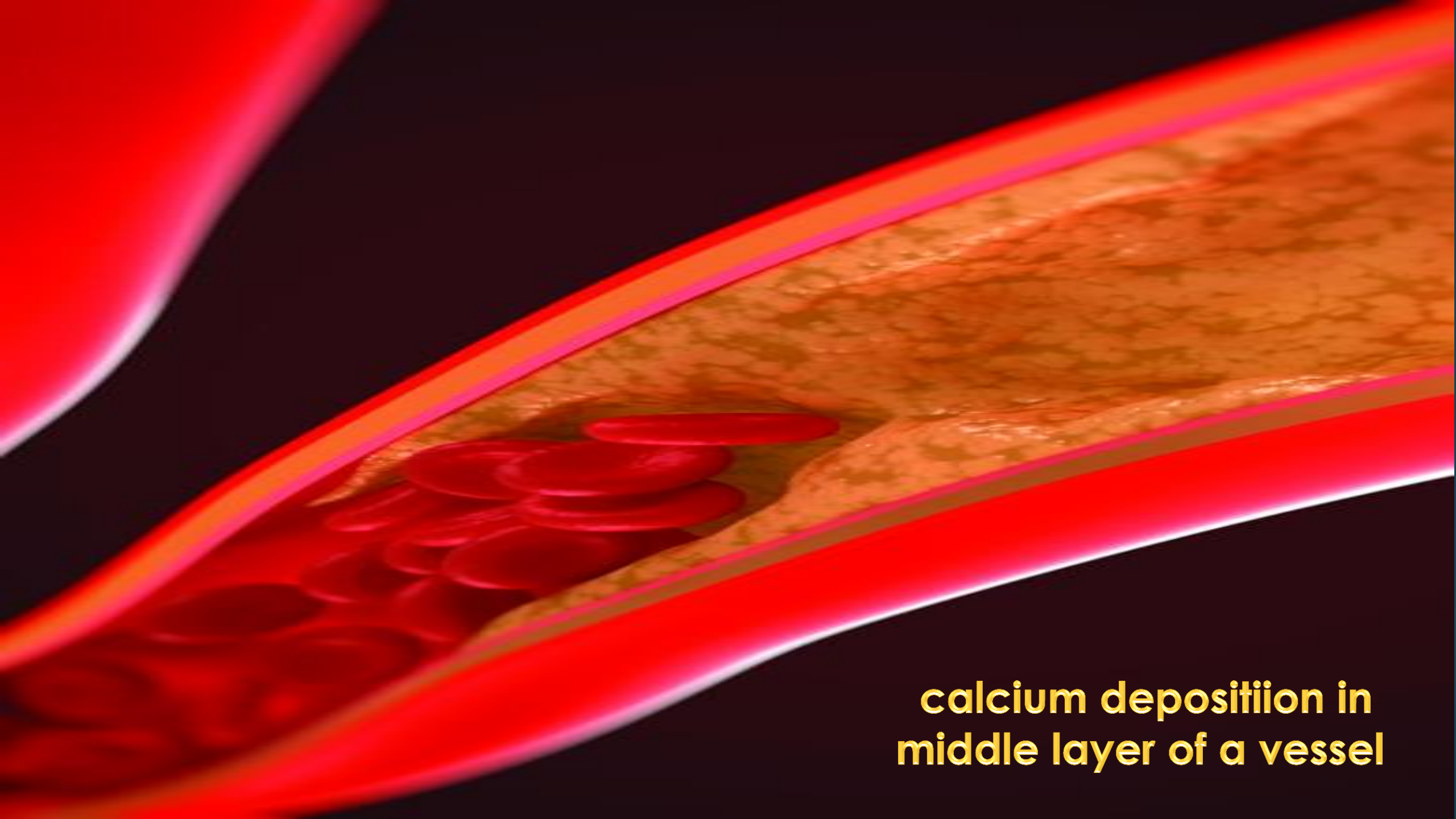
Problems with excessive calcium supplementation:

A study published in British medical journal in 2012 showed that those who used calcium supplementation had an increased risk of


- heart attack,
- renal stones and
- also prostate cancers

Problems with excessive calcium supplementation

Researchers suspect that the large burst of calcium that occurs in blood after supplementation may facilitate **the calcification of arteries** as the extra calcium intake above one's daily requirement is **not** absorbed by bones but rather excreted in urine causing **renal stones** or circulated in blood where it might attach to **atherosclerotic plaques** in **arteries** or **heart valves**.



**calcium depositiion in
middle layer of a vessel**

- 
- A study published in BMJ, May 2012 showed that calcium supplements may increase risk of cardiovascular diseases.
 - This study tracked almost 24,000 Europeans and suggested (in a subgroup analysis) that people taking only calcium supplements were about twice as likely to have a heart attack.
 - Exposure to excess amounts of calcium over time, without adequate magnesium sets the stage for endothelial dysfunction and formation of atherosclerotic plaque.

- ❖ **The U.S. Preventive Services Task Force (USPSTF)** recently found insufficient evidence to assess the value of calcium and vitamin D supplementation for the primary prevention of fractures in healthy men and premenopausal women.
- ❖ They found also that proof is lacking regarding reduction in the incidence of bone fractures in healthy postmenopausal women.
- ❖ Based on these considerations, the **USPSTF** recommended against daily supplementation with 400 IU or less of vitamin D3 and 1,000 mg of calcium carbonate for the primary prevention of fractures in non-institutionalized postmenopausal women.
- ❖ The task force also found insufficient evidence to recommend vitamin D and calcium supplements at any dose level to prevent fractures in men, or in premenopausal women.



Regarding calcium supplementation

Will the paradigm be shifted?

Answer : It should be



The disadvantages of calcium supplement outweigh the advantages

What is the bottom line?

- Only appropriate amount of calcium should be consumed to stay healthy and reduce risk for developing osteoporosis so nobody should take more than the **Upper Limit** of elemental calcium per day.
- One should try to consume calcium from foods or beverages.
- For people who cannot consume enough calcium from food and beverages and are unable to make changes in their eating habits, calcium supplementation may be necessary to obtain adequate calcium intakes.
- Adequate vitamin D in the body is important for calcium absorption. We can get vitamin D from vitamin D fortified milk and milk products, from exposure to sunlight on skin, and from some foods.

- ❖ Current recommendations regarding calcium supplements for people who have, or have risk factors for osteoporosis haven't changed. It's important to talk to doctor to determine what's best in individual case
- ❖ All the researchers agree that, given the widespread use of supplemental calcium, better studies are needed to clarify possible risks and benefits, and to whom they may apply.
- ❖ Until such information is available, consumers seeking to preserve their bones should be wise to rely primarily on dietary sources of the mineral and to pursue regular weight-bearing or strength-building exercises, or both. Walking, running, weight lifting and working out on resistance machines is unquestionably effective and safe for most adults .



THANK YOU