



HUG
Hôpitaux Universitaires de Genève

Osteoporosis Pathogenesis and Management

Osteoporosis

Low Peak Bone Mass
Sex Hormone Deficiency
Age
Nutritional Insufficiency

Mechanical Incompetence

Fracture

Fracture Treatment

Rehabilitation

- > To Restore Independence
- > To Reduce Disabilities

Prevention Subsequent Fracture



HUG
Hospitaux Universitaires de Genève

Osteoporosis Pathogenesis and Management

Falls

Sway
Walking
Muscle Strength
Neuro-muscular Impairment

Osteoporosis

Low Peak Bone Mass
Sex Hormone Deficiency
Age
Nutritional Insufficiency

Mechanical Overload

Mechanical Incompetence

Fracture

Fracture Treatment

Rehabilitation

- > To Restore Independence
- > To Reduce Disabilities

Prevention Subsequent Fracture



HUG
Hospitals Universitaires de Genève

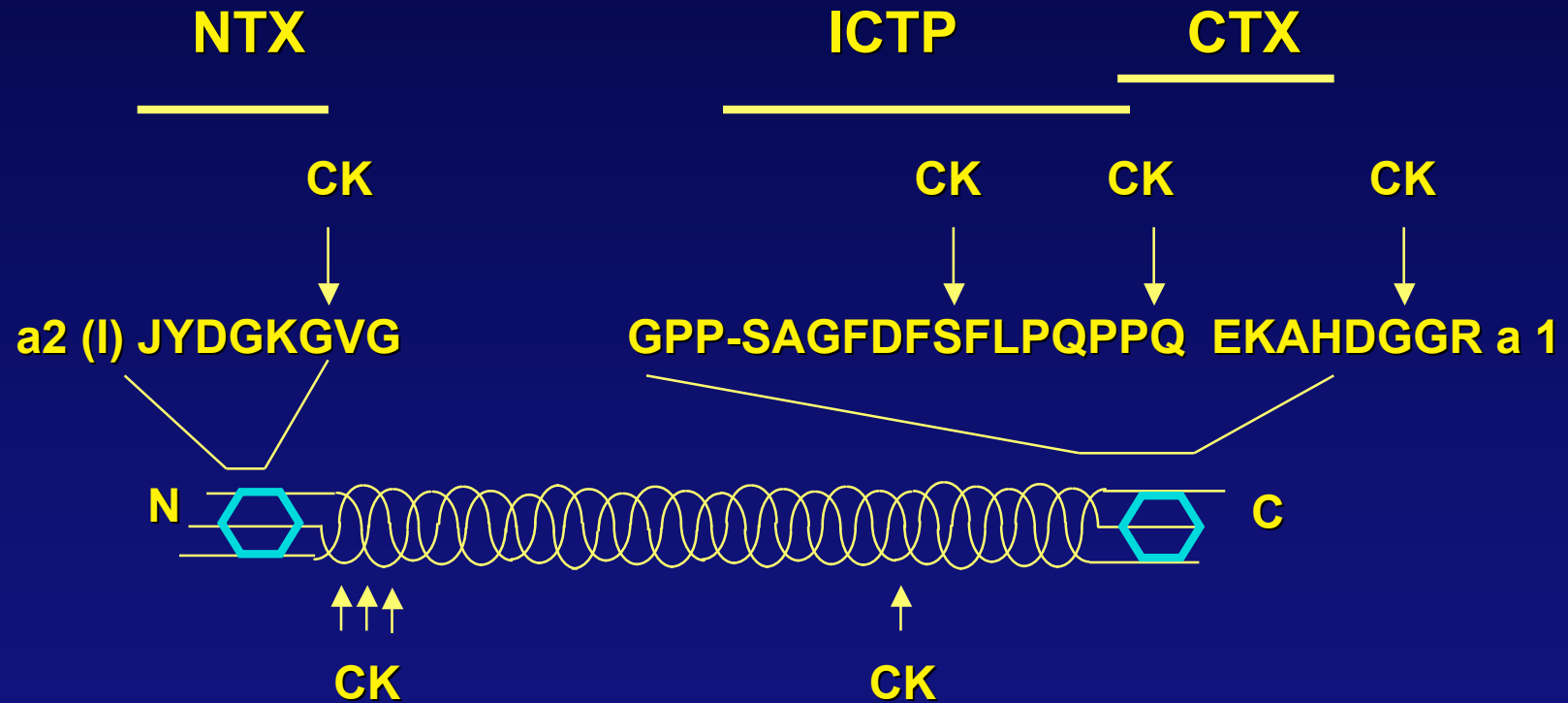
Determinants of Fracture Risk

1. Age
2. Prevalent Fracture
3. Family history of Fracture
4. Glucocorticoid
5. Low BMI
6. Alcohol, Smoking
7. Baseline BMD
8. Baseline Turnover



HUG
Hôpitaux Universitaires de Genève

Type I collagen epitopes and Cathepsin K cleavage sites



Deoxypyridinoline
Pyridinolines

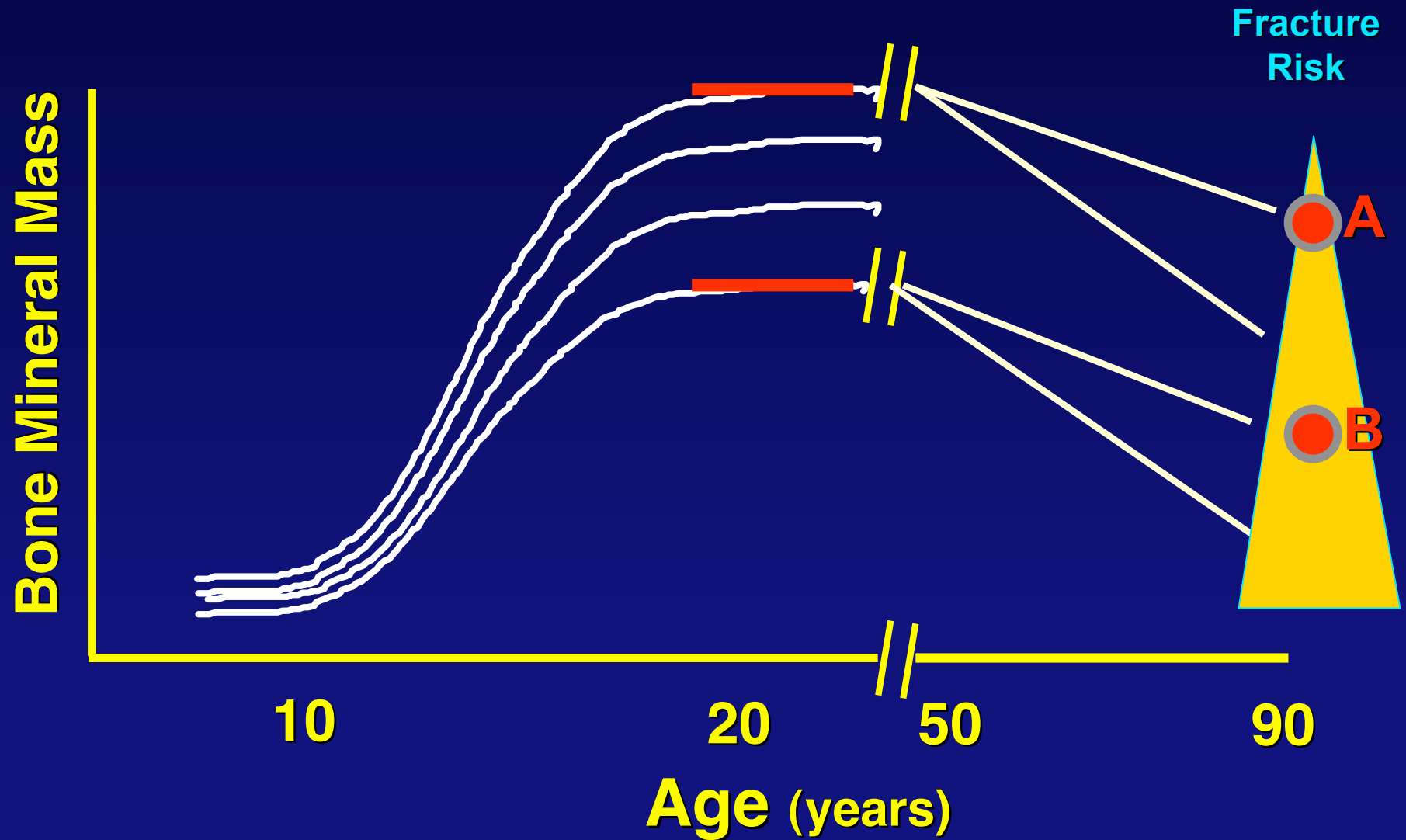
Garnero et al., JBC, 1998

Sassi et al., Bone, 2000



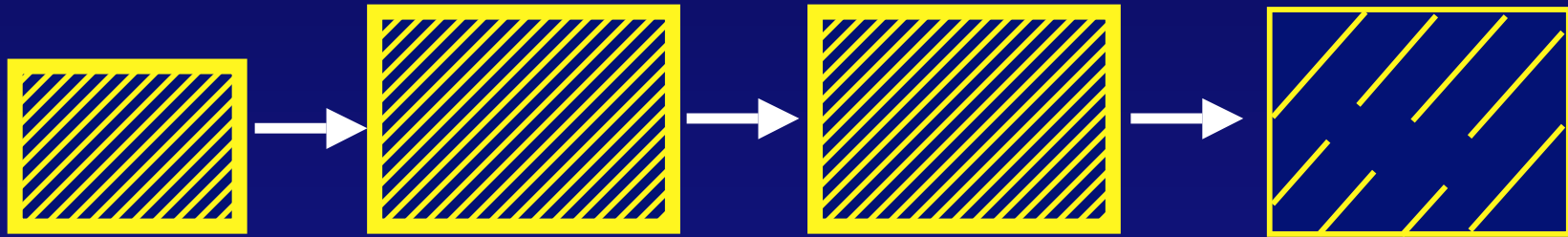
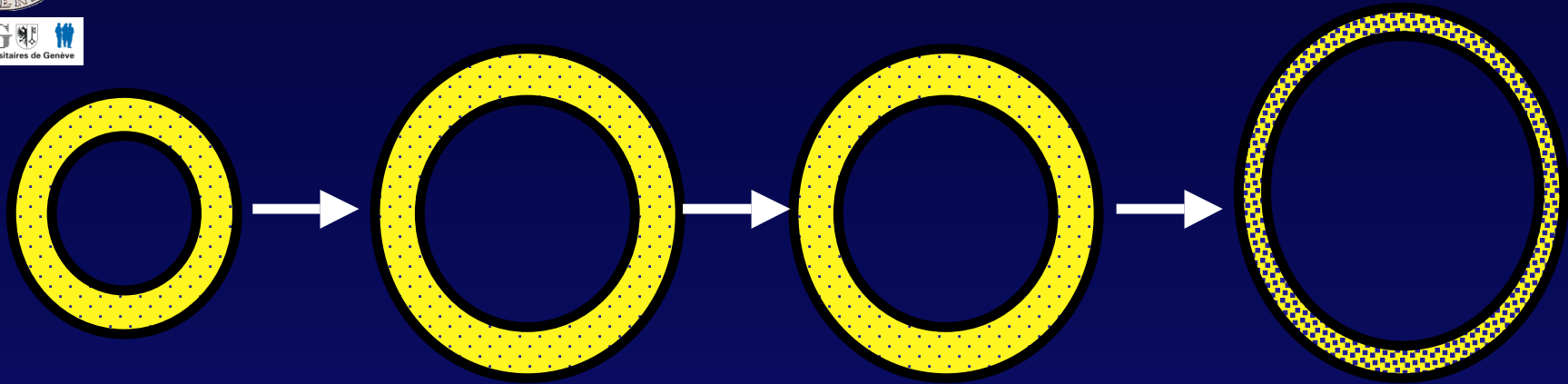
HUG
Hospitaux Universitaires de Genève

Tracking of Bone Mineral Mass





HUG
Hôpitaux Universitaires de Genève



Age: 10

20

40

70

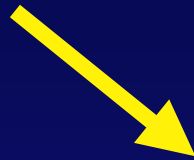
Rizzoli et al., J Mol Endocrinol 2001



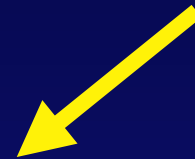
HUG
Hospitals Universitaires de Genève

Heredity

Gender



Mechanical
Forces



Peak Bone Mass

Hormones

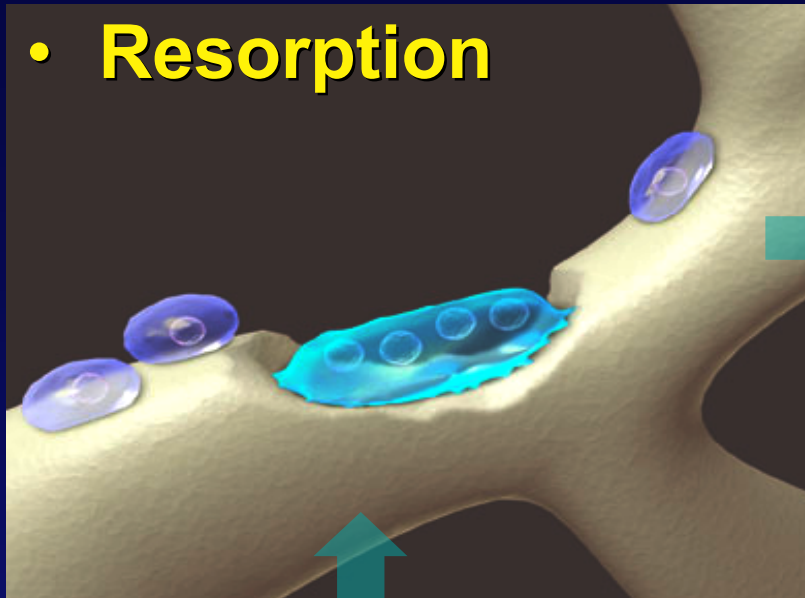


Risk Factors

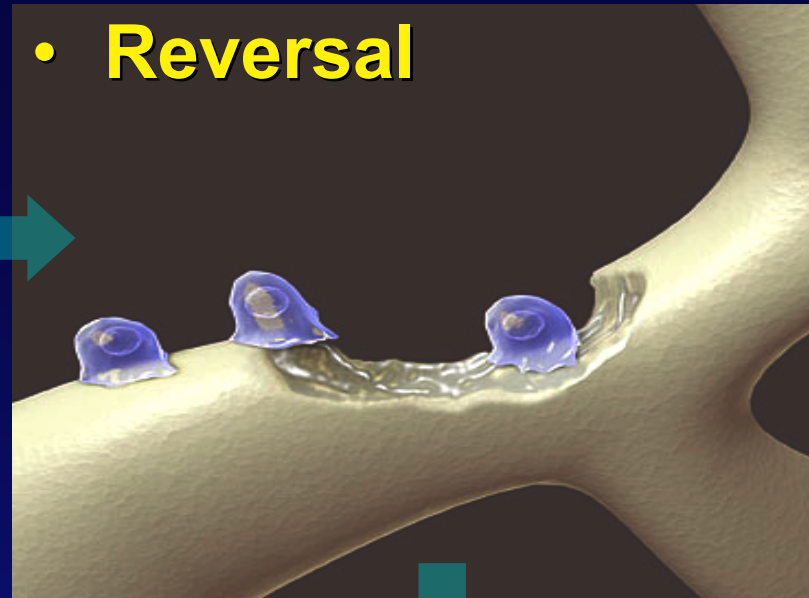


Nutrition

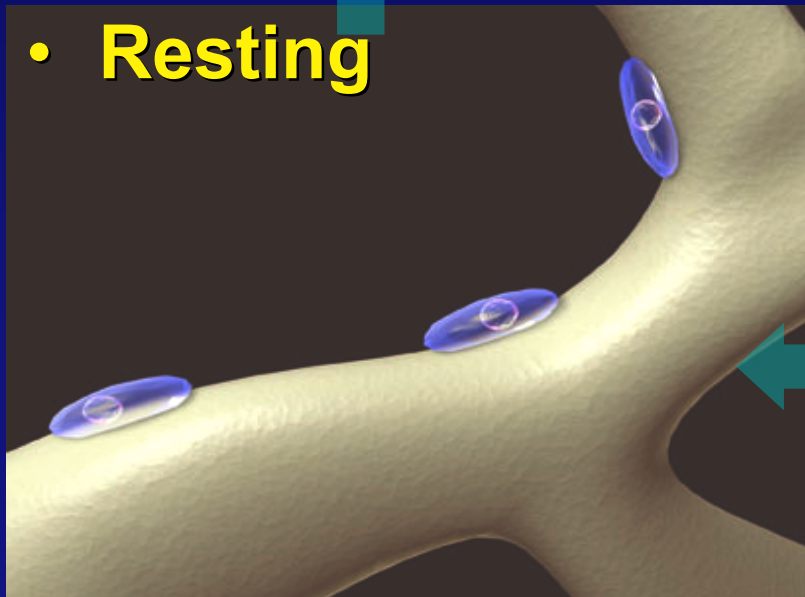
- **Resorption**



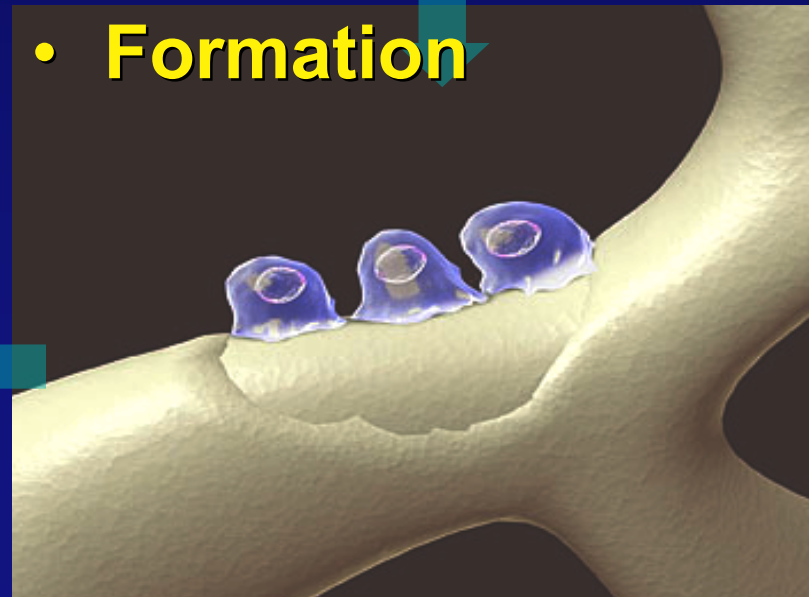
- **Reversal**



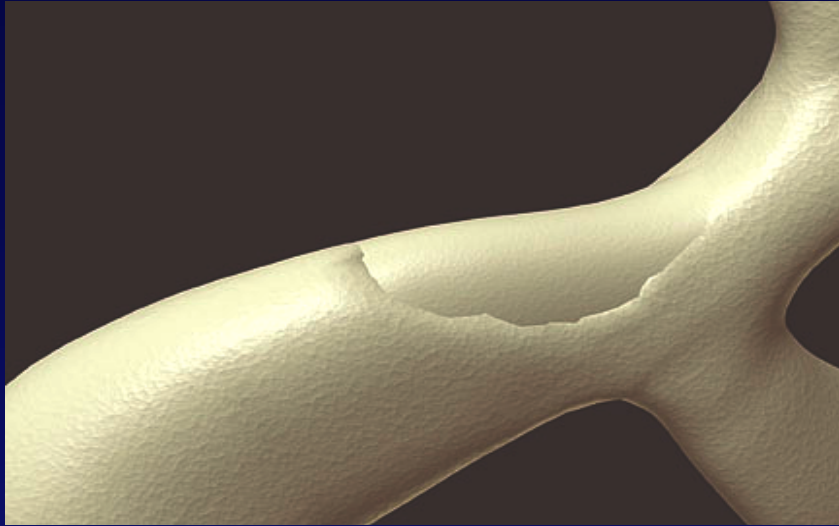
- **Resting**



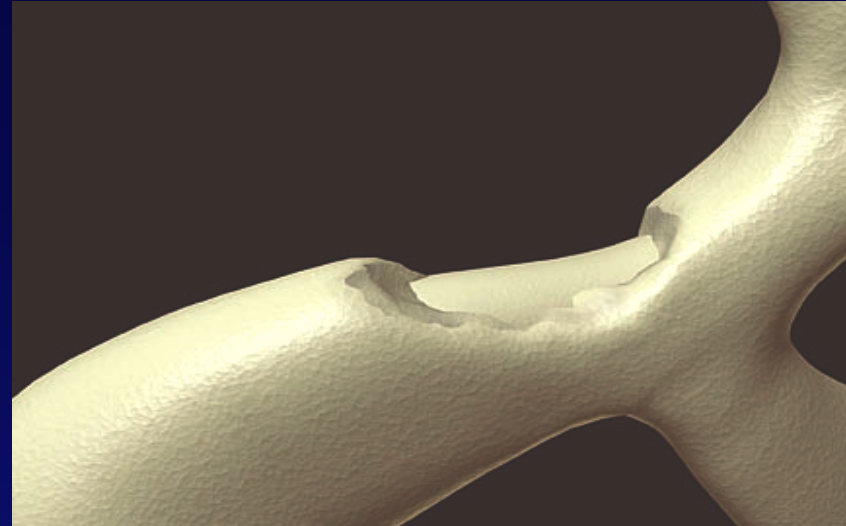
- **Formation**



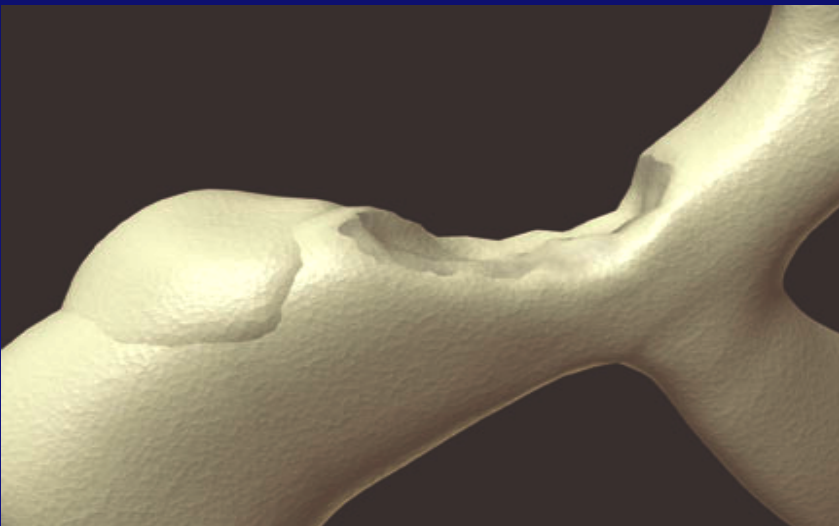
•Coupled and balanced



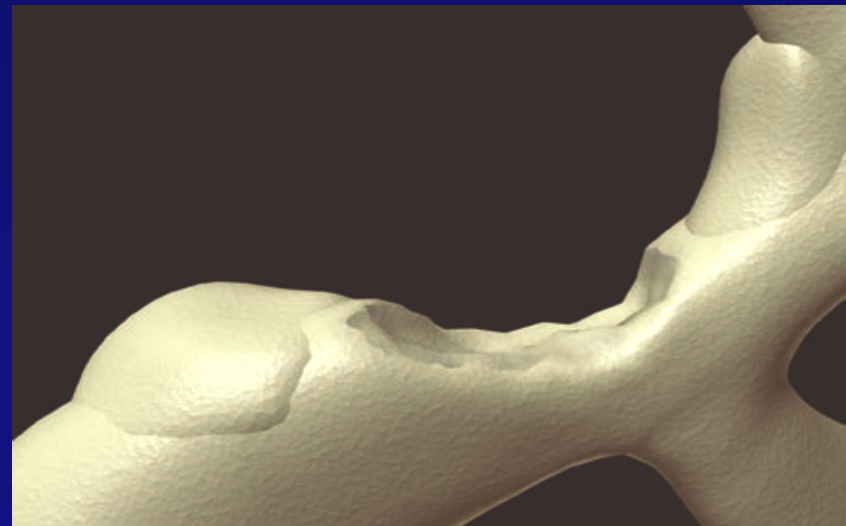
•Coupled but imbalanced



•Uncoupled but balanced



•Uncoupled and imbalanced





HUG
Hôpitaux Universitaires de Genève

MALNUTRITION IN ELDERLY

Calcium Deficiency

Vitamin D Deficiency

-> PTH -> Bone Resorption

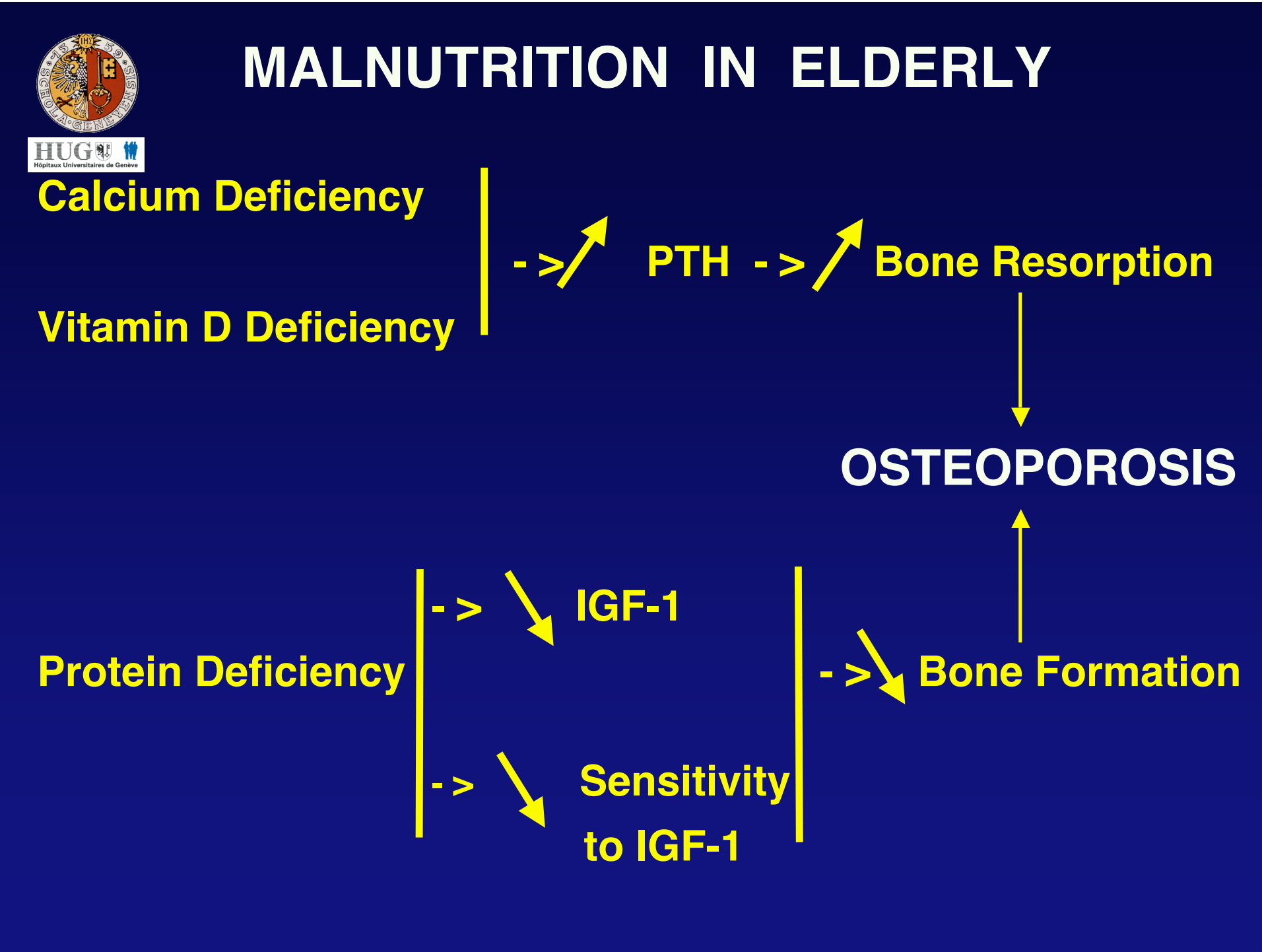
OSTEOPOROSIS

Protein Deficiency

-> IGF-1

-> Sensitivity
to IGF-1

-> Bone Formation





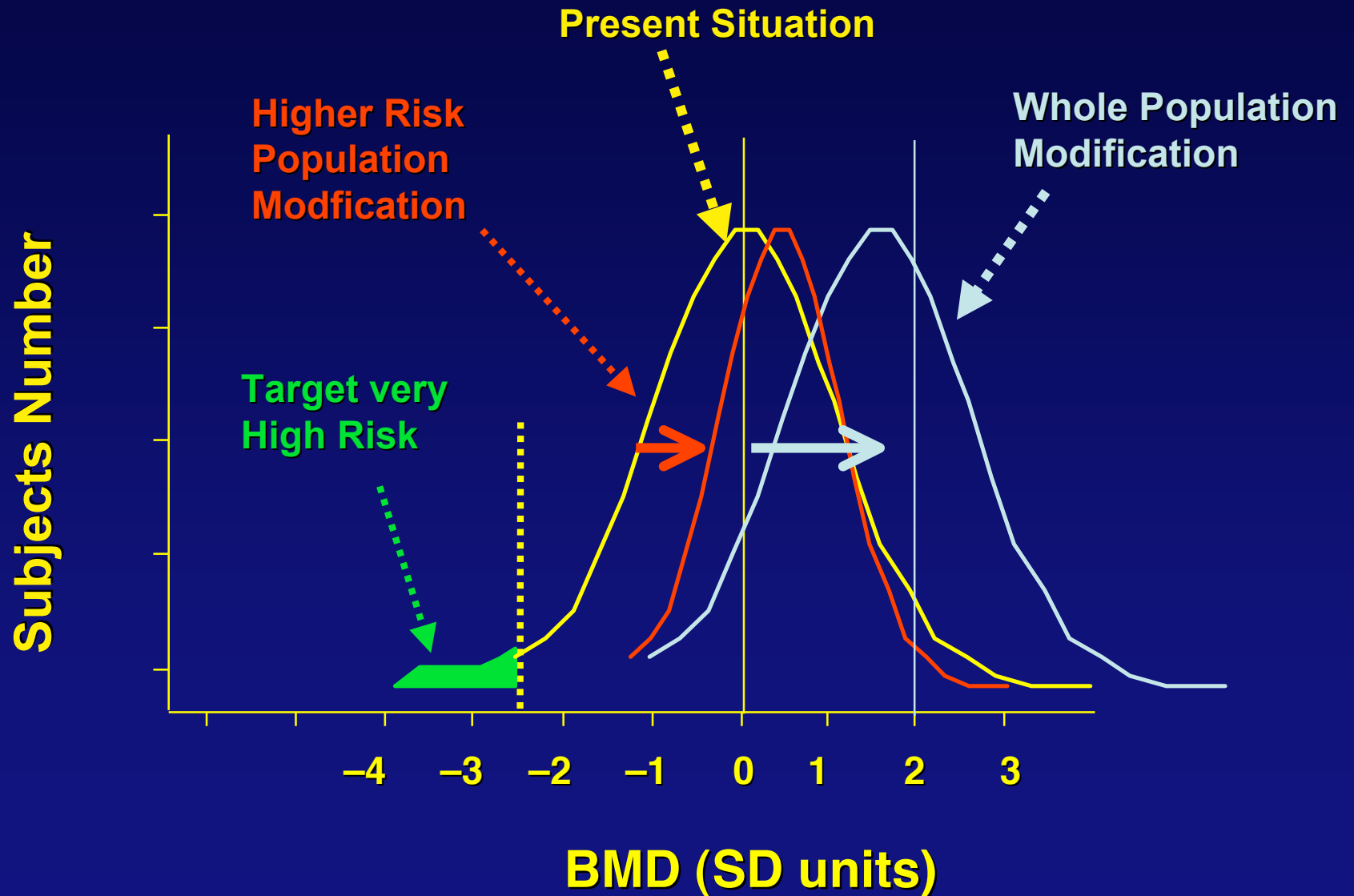
Management

- **Indication to treatment**
- **Treatment possibilities**



HUG
Hôpitaux Universitaires de Genève

Osteoporosis Preventive Strategies





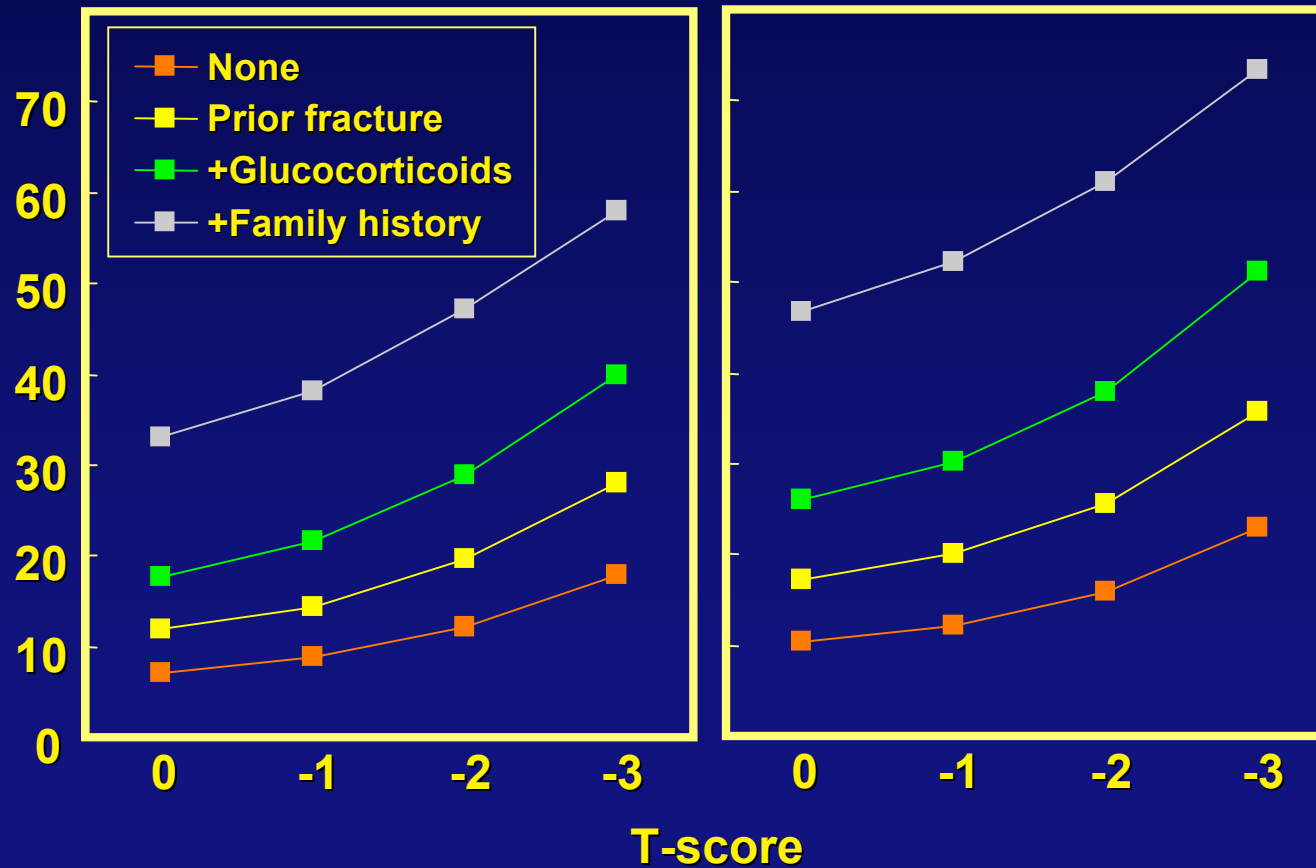
HUG
Hospitals Universitaires de Genève

Probability of osteoporotic fracture* at age 65

Men

Women

10-year probability (%)



US Caucasian, no CRF, BMI=24

*Hip, spine, humerus, forearm



FRAX WHO Fracture Risk Assessment Tool

[HOME](#)[CALCULATION TOOL](#)[FAQ](#)[REFERENCE](#)Your Country : **UK**Name / ID : [About the risk factors](#)

Weight Conversion:

pound: [convert](#)1 pound = 0.453592 kg

Height Conversion:

inch: [convert](#)1 inch = 2.54 cm

Questionnaire:

1. Age (between 40-90 years) or Date of birth

Age:

Date of birth:

Y:

M:

D:

2. Sex

 Male Female

3. Weight (kg)

4. Height (cm)

5. Previous fracture

 No Yes

6. Parent fractured hip

 No Yes

7. Current smoking

 No Yes

8. Glucocorticoids

 No Yes

9. Rheumatoid arthritis

 No Yes10. Secondary osteoporosis No Yes11. Alcohol 3 more units per day No Yes

12. Femoral neck BMD

T-score

[Clear](#)[Calculate](#)**24****23.9****8.0**



HUG
Hospitaux Universitaires de Genève

10-Year Risk:

