



glanbia[®]
NUTRITIONALS

TruCal[®]
**Calcium
Designed by
Nature**

Glanbia Nutritionals, Inc.

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Overview

- Benefits
- Market Opportunity
- Bone Remodeling
- Balanced Profile
- Nutritional Strategies for Bone Health
- Bioavailability
- Research – Mouse and Human
- Applications
- Conclusion
- Questions

Benefits

TruCal[®] Milk Calcium

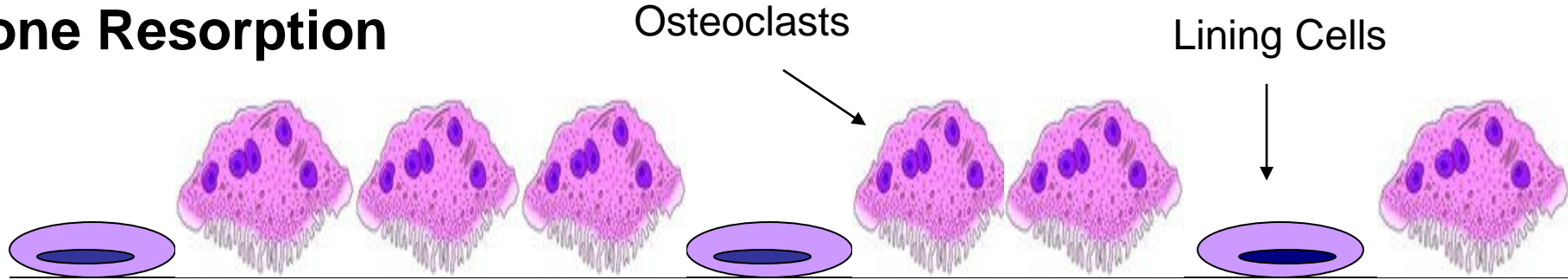
- Natural
- Balanced Mineral Profile
- Bioavailable
- Improves bone density and strength
- Improves antioxidant status
- Formulation Friendly
- Low Flavor Impact

Market Opportunity

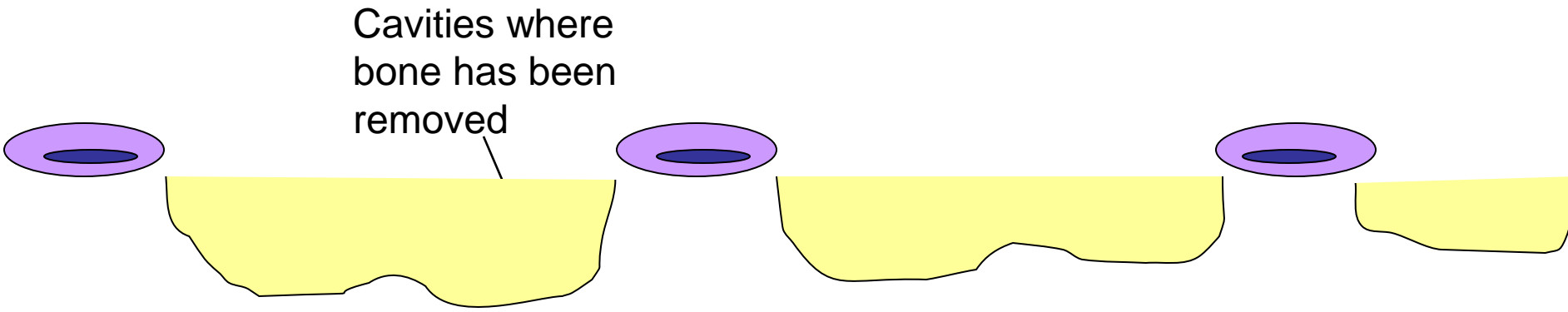
- 10 million cases of Osteoporosis in the US
- 34 million individuals at risk in the US
- 55% of people over the age of 50 are afflicted in the US
- 80% of cases of Osteoporosis in the US are women
- 13.5 percent of girls and 36.3 percent of boys age 12 to 19 in the USA get RDA of calcium

Bone Remodeling

Bone Resorption

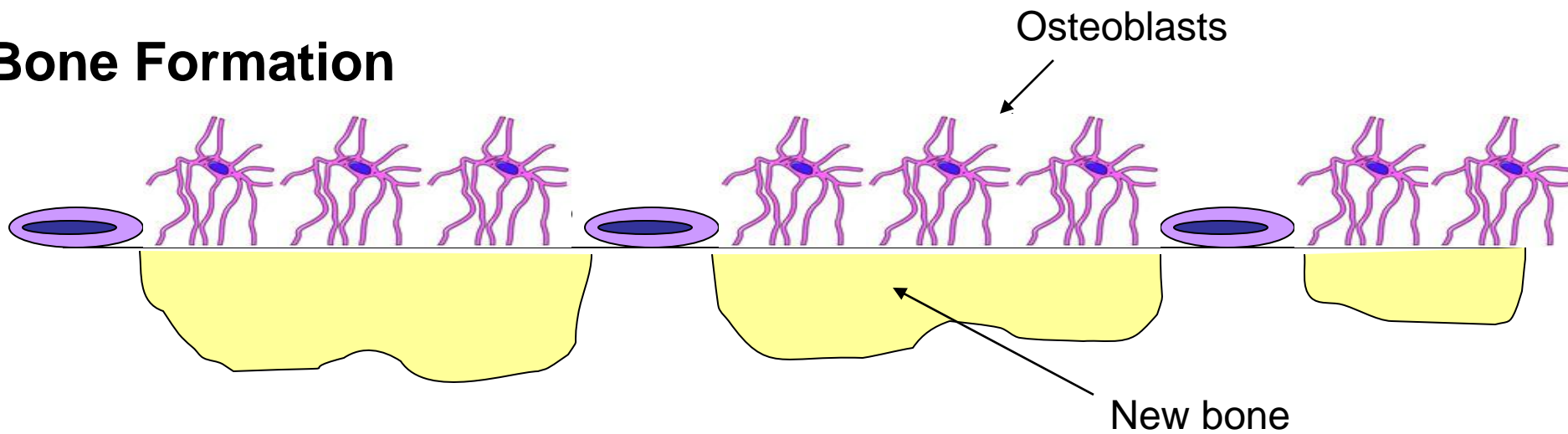


Bone Resorption Complete

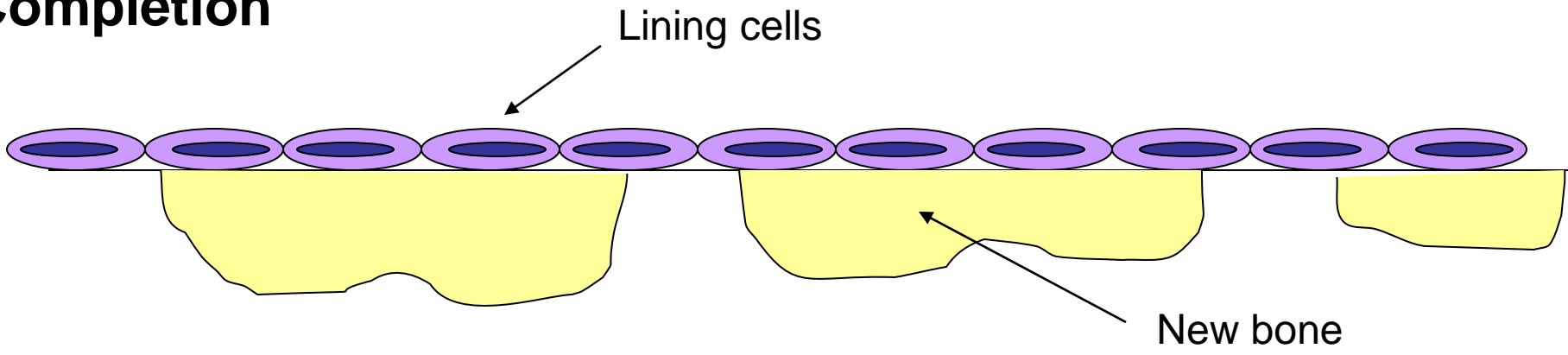


Bone Remodeling

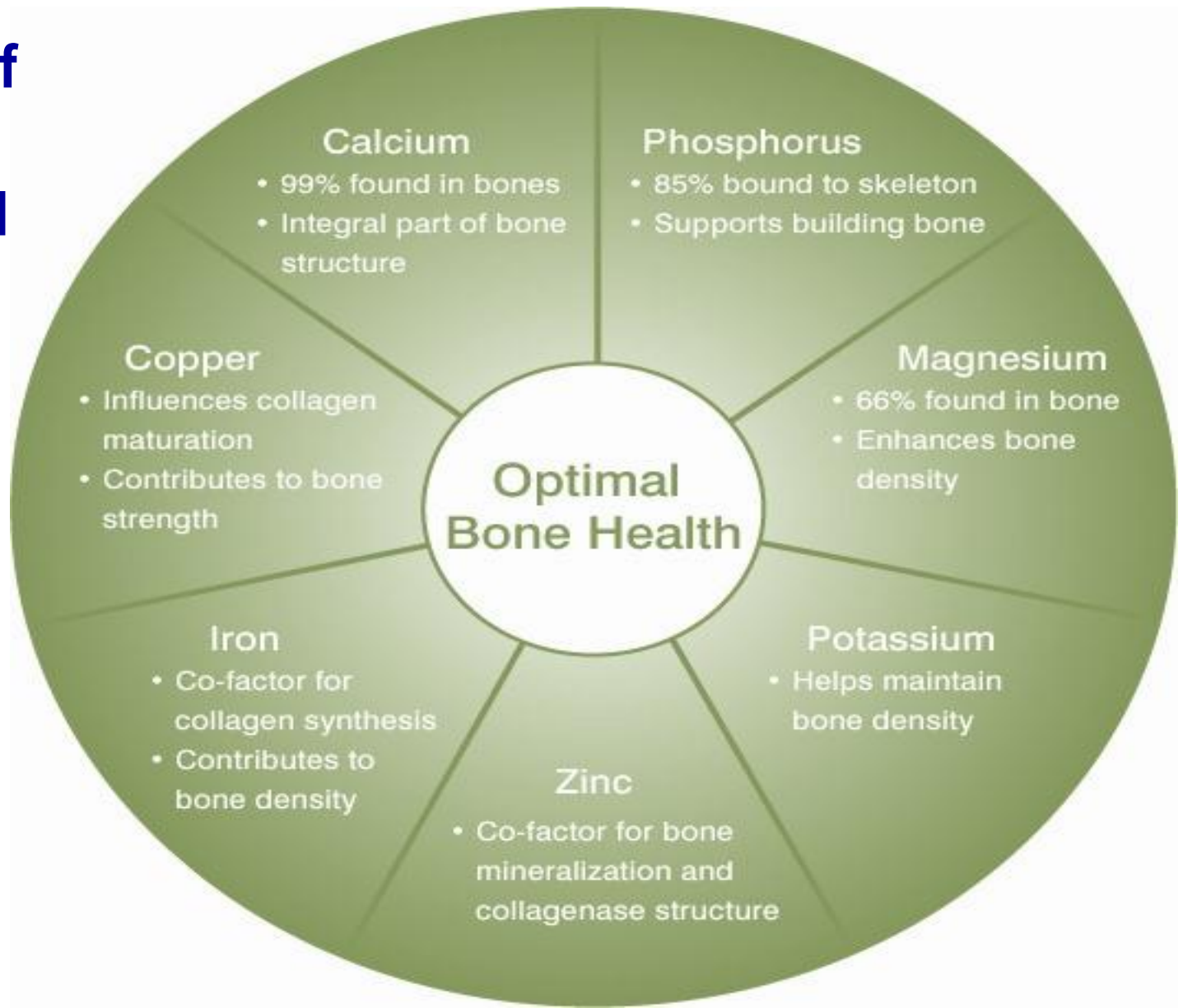
Bone Formation



Completion



Benefit of Trucal's Balanced Profile



Balanced Approach

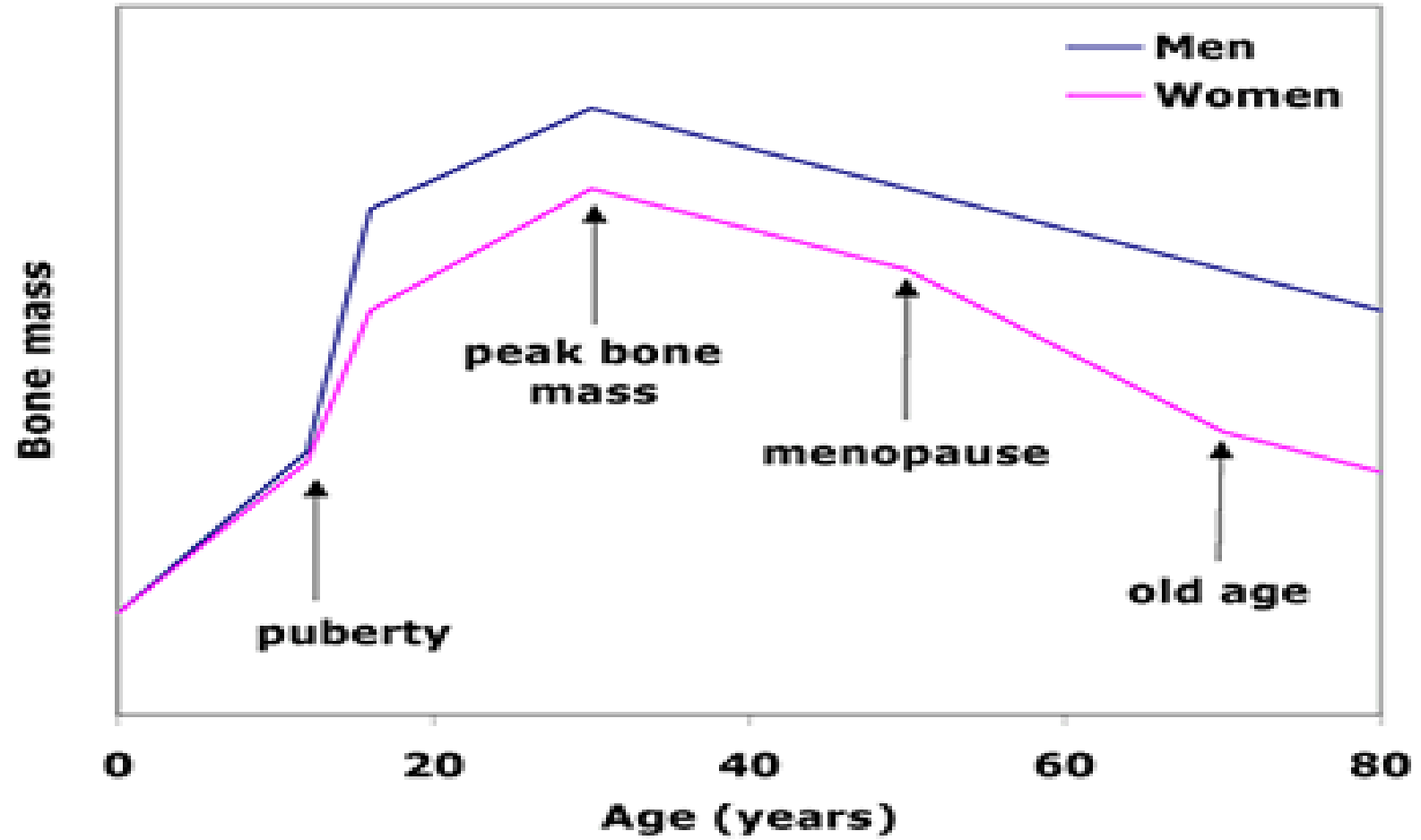
- TruCal is the solution to balanced bone health.

Mineral	Bone	TruCal
Calcium	25%	24%
Phosphorus	12%	12.5%
Magnesium	0.37%	1.5%
Potassium	0.7%	0.8%
Zinc	0.009%	0.008%
Copper	0.0005%	0.0004%

Nutritional Strategies

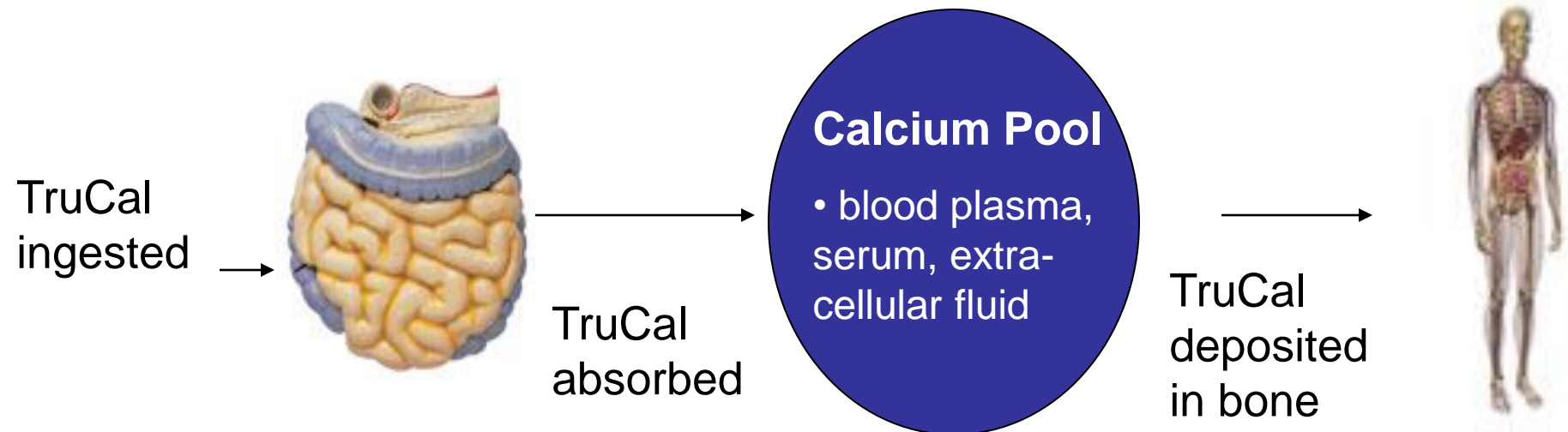
- Main factors contributing to Osteoporosis are:
 - Nutrition
 - Genetics
 - Lifestyle
- Main determinants of Osteoporosis are:
 - level of peak bone mass
 - subsequent rate of bone loss
- Preventative strategies
 - Primary – maximize PBM
 - Secondary – reduce bone loss

Changes in Bone Mass with Age



TruCal Bioavailability

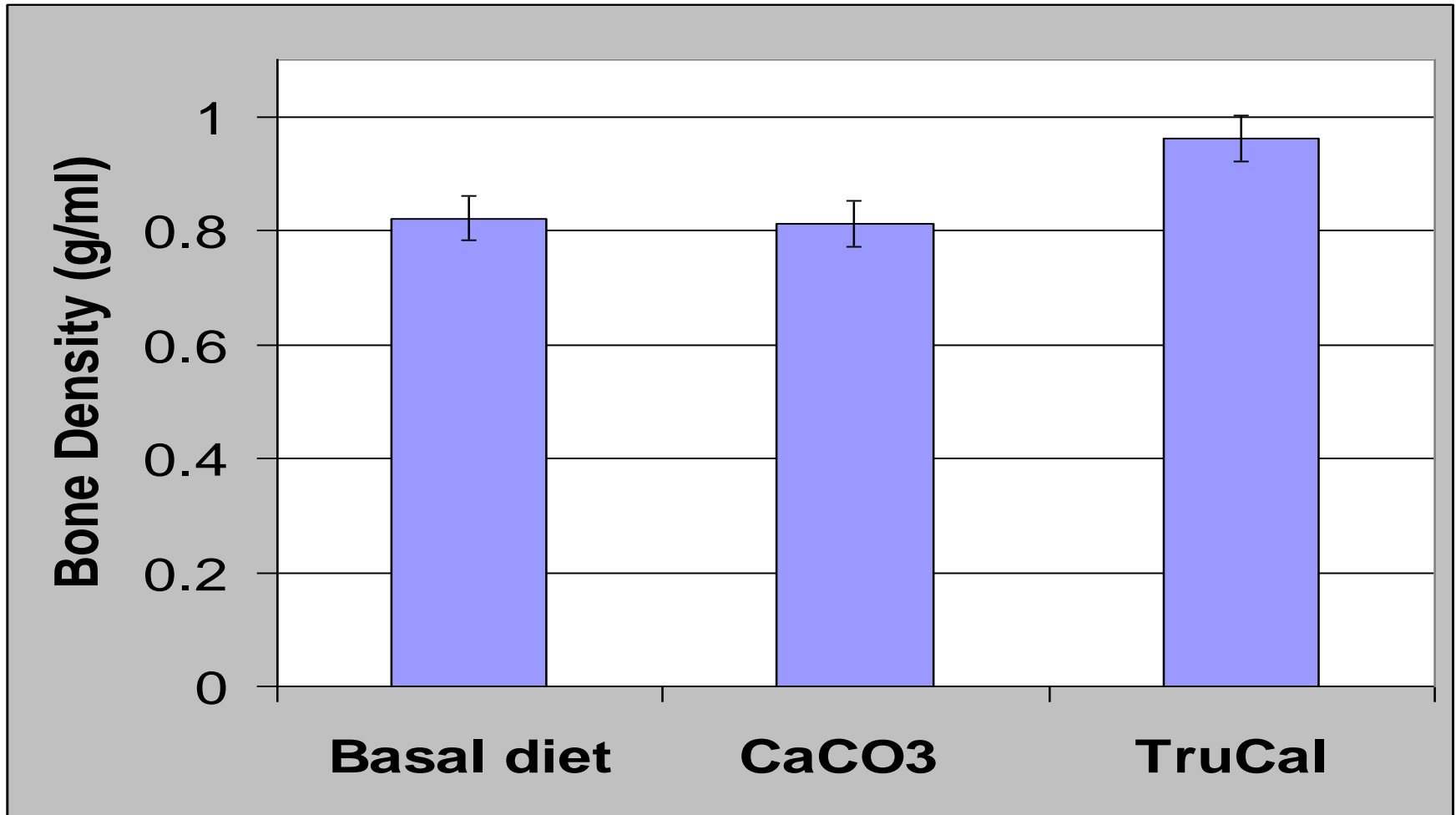
- readily absorbed and physiologically available for bone formation and mineralization
- translates into increased bone density and strength
- benefit of balanced mineral profile



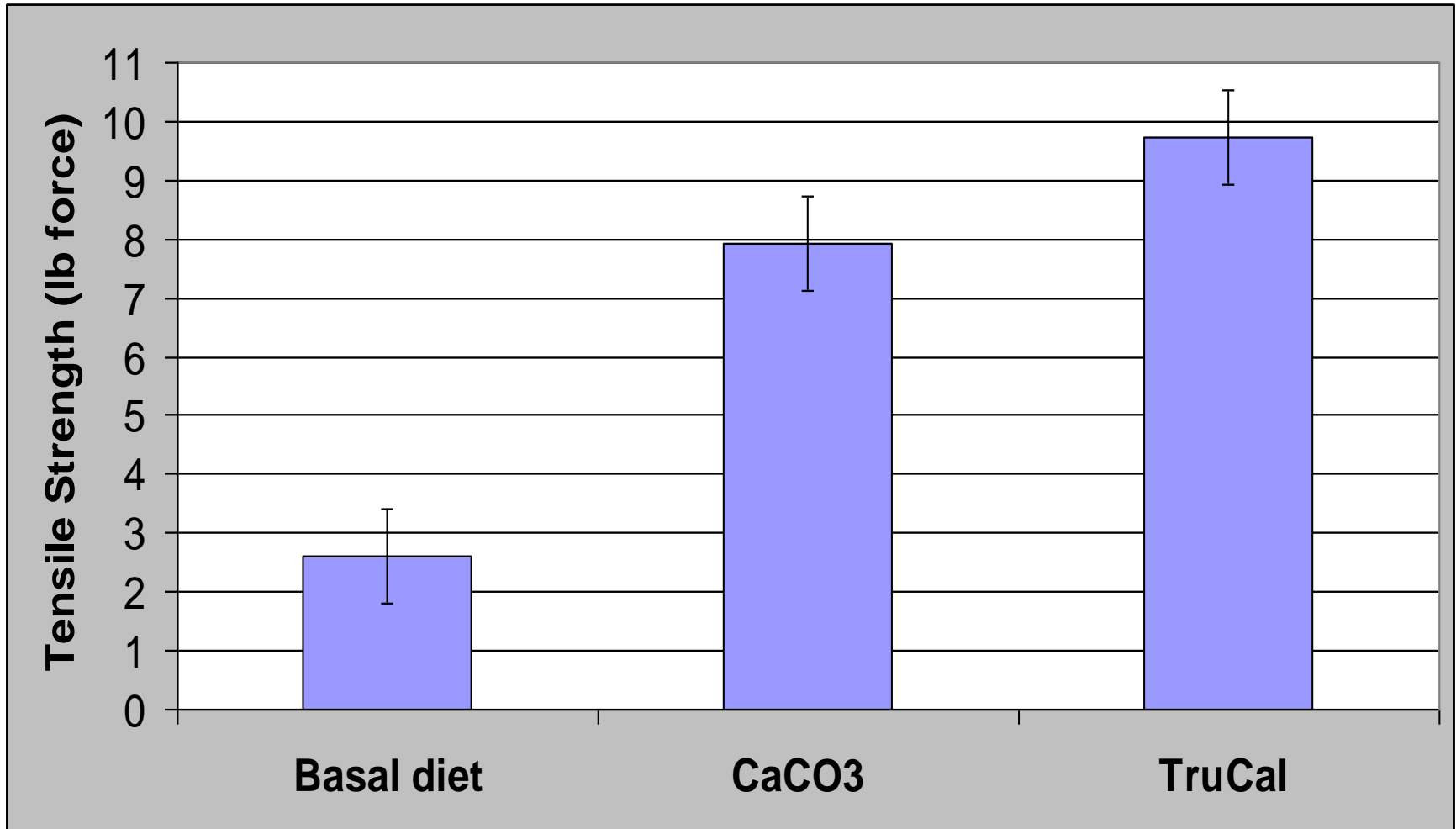
Bioavailability Mouse Study

- Measured TruCal's impact on the following parameters:
 - Bone Density
 - Bone Tensile Strength
- Young growing mice
- 30% RDA to evaluate different Ca sources
 - TruCal
 - CaCO³
- Basal Diet 5% RDA

Bone Density



Bone Tensile Strength



Bioavailability Mouse Study

Summary

- TruCal provides a bioavailable source of milk minerals that are absorbed and physiologically available for bone formation and mineralization
- TruCal was superior to calcium carbonate when evaluating bone tensile strength and bone density in young growing rats.

Bone Biomarker Human Clinical

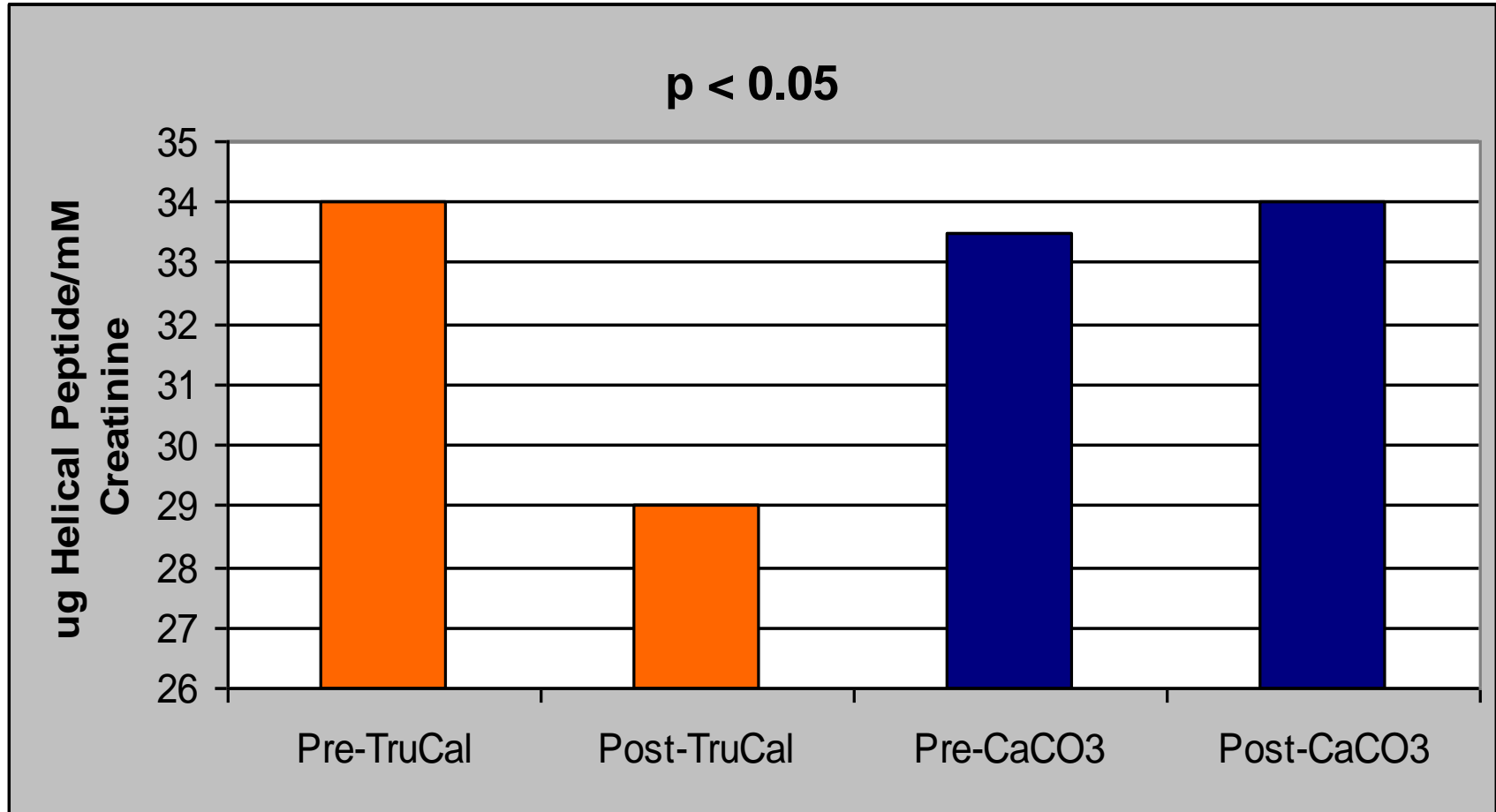
Study Design

- Measure TruCal's impact on the following sensitive bone markers:
 - Urine Helical Peptide (UHP)
 - Bone Alkaline Phosphatase (BAP)
- 20 female adults
- 350 mg calcium 2x/day with meal
 - Total 700 mg Ca/day
- Randomized into two groups
 - TruCal
 - CaCO₃
- 6-week trial

Bone Biomarker Human Clinical

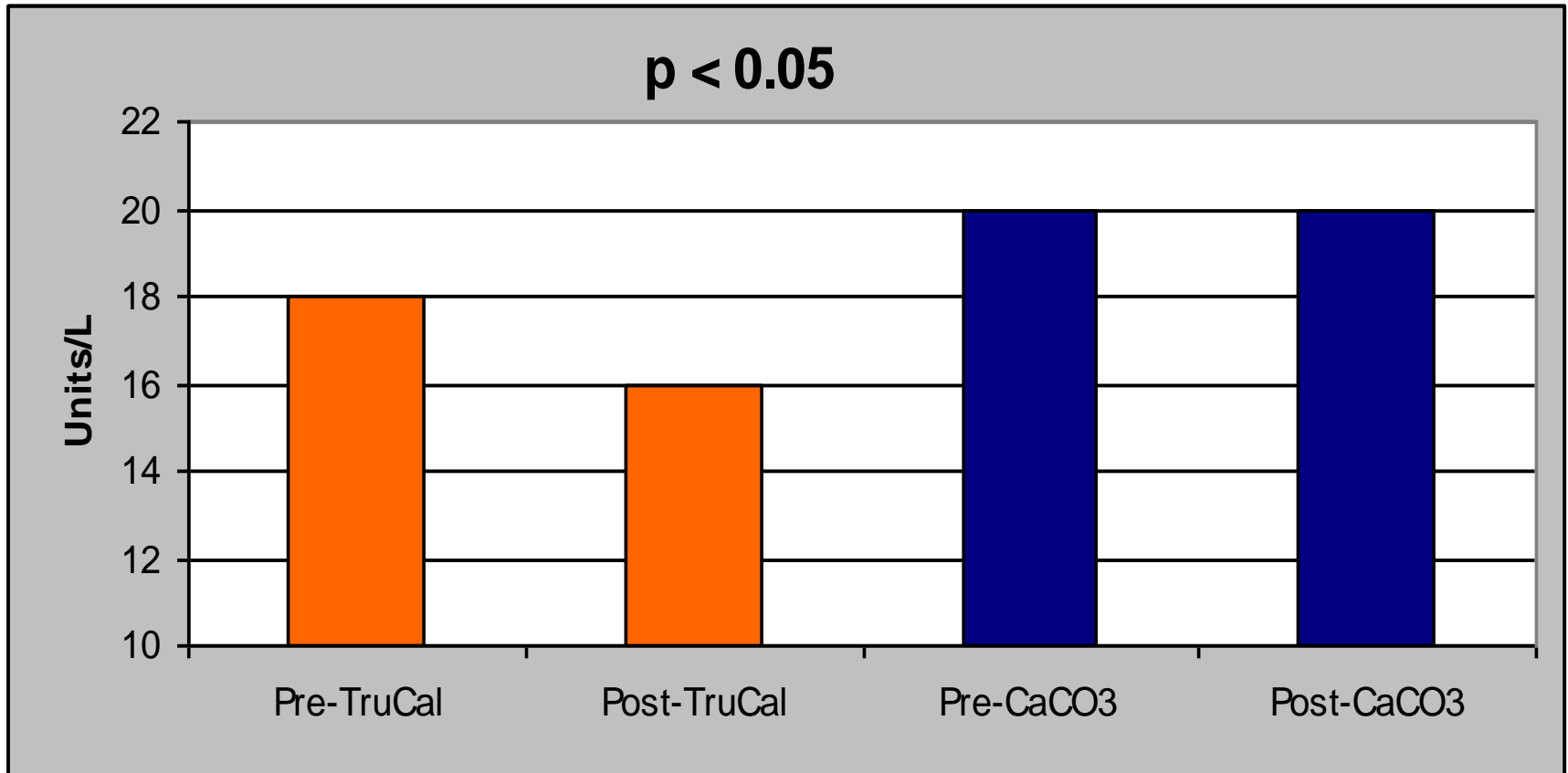
- UHP and BAP are Sensitive Biomarkers
 - UHP
 - Biomarker bone resorption
 - BAP
 - Biomarker bone turnover

UHP - Marker for Bone Resorption



Lower is better!

BAP - Marker of Bone Turnover



Lower is better!

Bone Biomarker Human Clinical

Research Summary

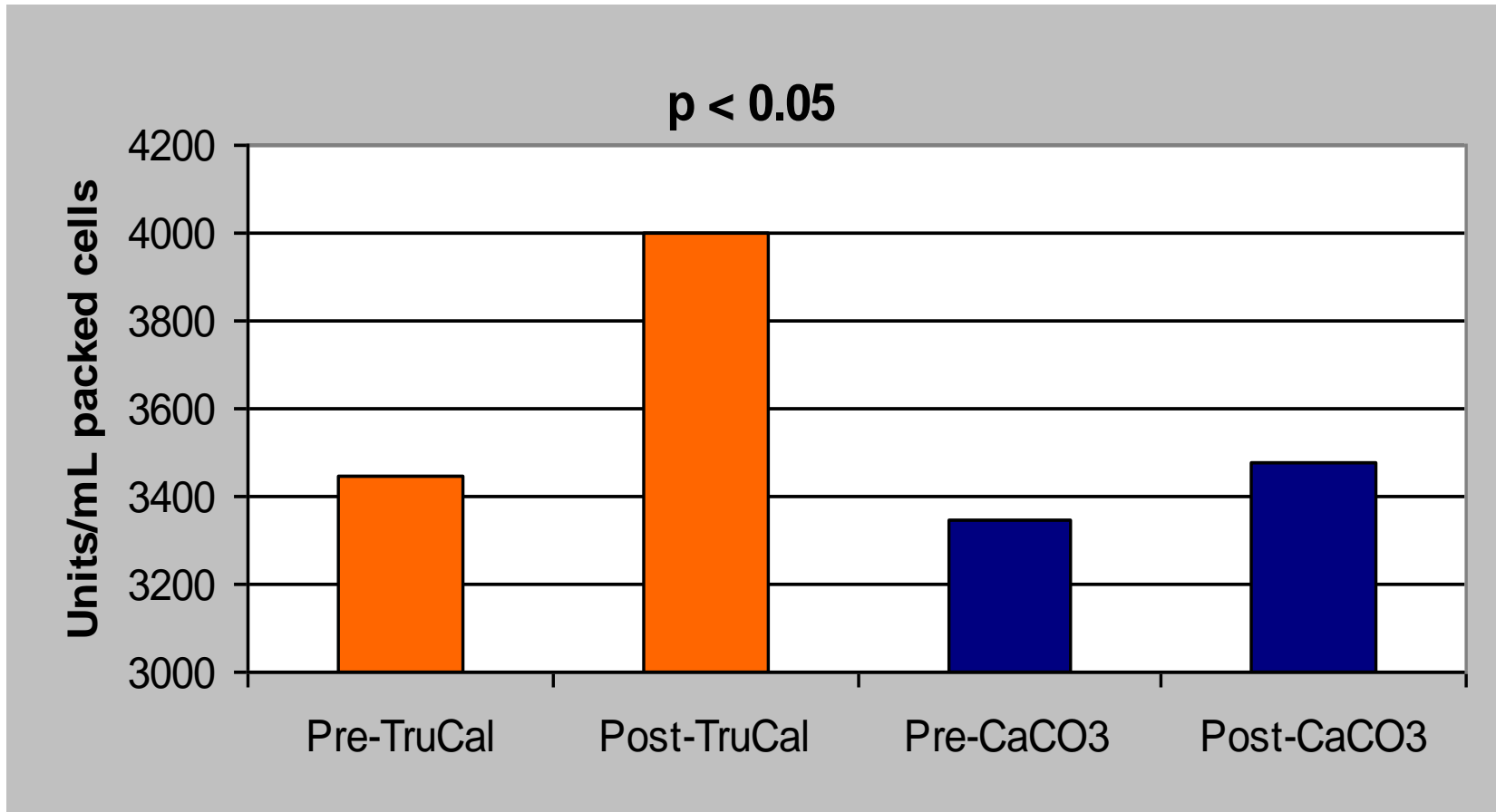
- TruCal resulted in:
 - Less bone breakdown (UHP)
 - Less bone turnover (BAP)
- Versus CaCO₃:
 - Slight response (UHP)
 - No response (BAP)
- TruCal is critical in the development and maintenance of strong, healthy bones

Antioxidant Human Clinical

Study Design

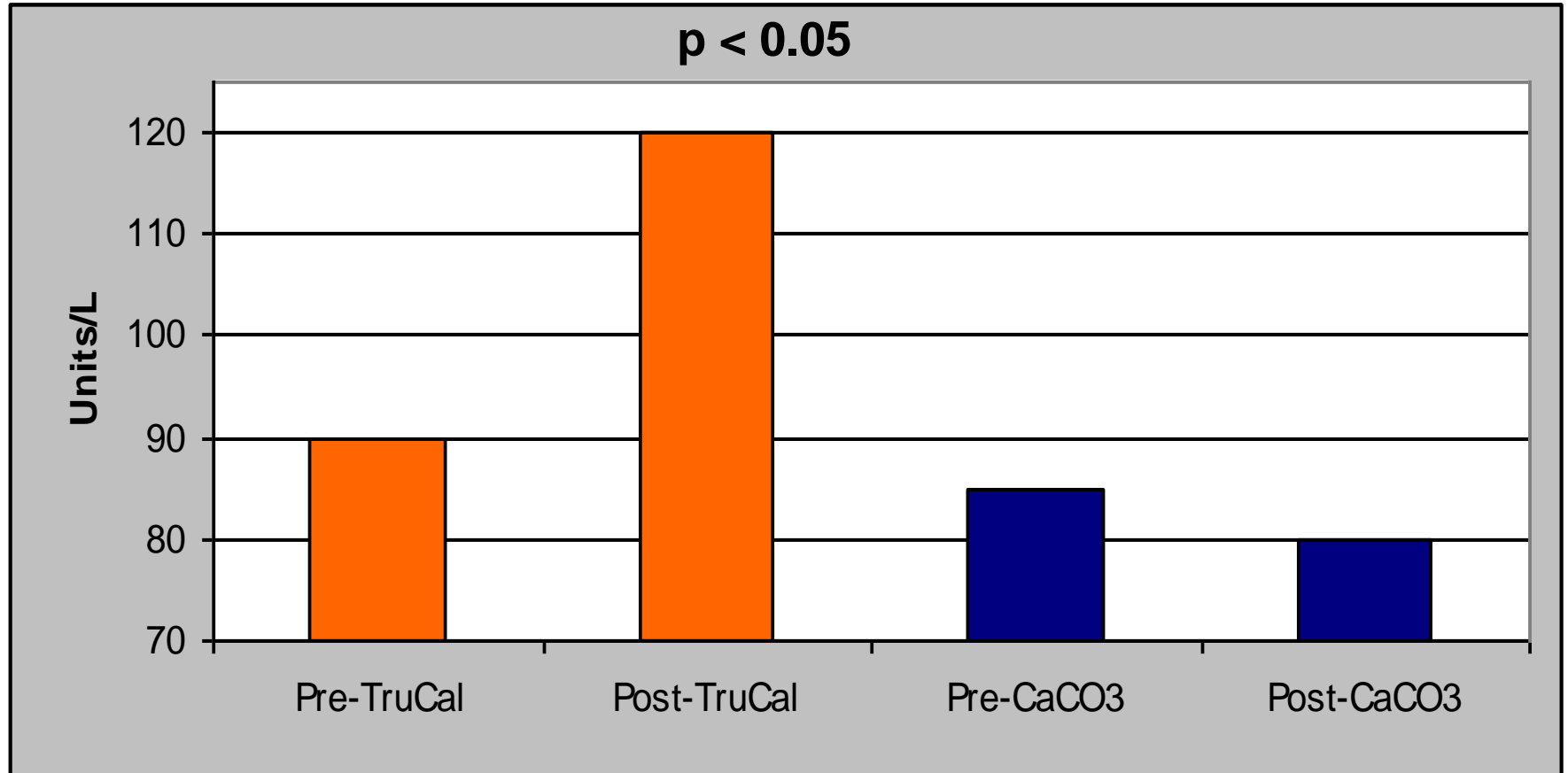
- Second component of human clinical: measuring antioxidant potential
 - Measure impact of TruCal on Red Blood Cell SOD1 and Serum SOD1.
 - Superoxide Dismutase (SOD) functions as an antioxidant

Red Blood Cell SOD1



Higher is better!

Serum SOD1



Higher is better!

Antioxidant Human Clinical

Research Summary

- TruCal may increase the body's ability to remove free radicals.
- As we age high risk for poor AOX status
- May suppress bone resorption
- Additional research is needed

Formulation Friendly

- Low flavor impact
- Soluble at acid pH
- Fat Free
- GRAS
- Clean Label
 - Milk Calcium Complex
 - Whey Calcium Complex
 - Whey Mineral Complex

Applications

- Beverages
- Nutritional Bars
- Dairy
- Nutritional Supplements
- Bakery Applications

Conclusion

- Significant market opportunity
- Balanced mineral profile
- Bioavailable
- Maximize peak bone mass and reduce bone loss
- Improve antioxidant status
- Formulation friendly
- Suitable for a wide variety of applications

Questions?