

DUAL-ENERGY X-RAY ABSORPTIOMETRY (DXA) REVEALS POLYPHENOL-INDUCED CHANGES IN BODY COMPOSITION IN SMALL ANIMALS

Tiina E KÄHKÖNEN¹, Jussi M HALLEEN¹

¹ **OncoBone Ltd, Oulu, Finland**, Correspondence to: tiina.kahkonen@oncobone.com

Introduction: Dual-energy X-ray Absorptiometry (DXA) technology utilizes variable absorption of X-rays by different body components, which allows reliable analysis of body composition, including body weight, fat and lean mass. DXA is a method of choice for repeated imaging and analysis of diet-induced changes in live small animals such as rodents.

Materials & Methods: Precision and accuracy of iNSiGHT DXA (OsteoSys, Korea) was compared to another imaging technique Nuclear Magnetic Resonance (NMR) by multiple imaging and analysis of body composition in mice (**Figure 1**). Diet-induced changes in body composition by a lychee-based polyphenol oligonol was studied in ovariectomized (OVX) rats for 6 weeks (**Figure 2**).

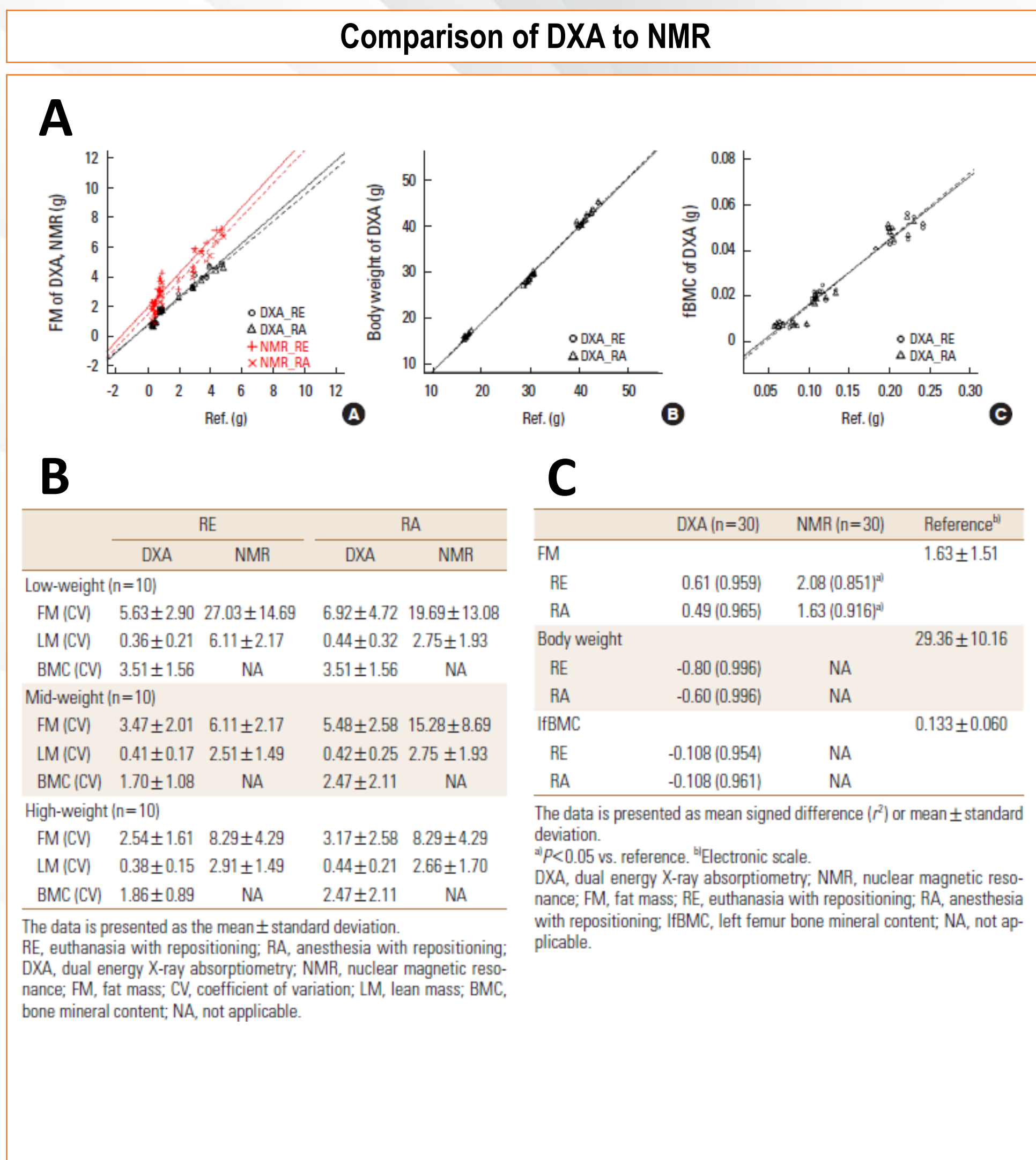


Figure 1: Comparison of DXA to NMR. A) Correlations between measurement results and reference values of DXA and NMR. B) Tabulated correlation data in different weight animals. C) Correlation for FM, body weight and fBMC and reference values.

Abbreviations: RE = repositioning in euthanasia, RA = repositioning in anesthesia, FM = fat mass, fBMC = femoral bone mineral content.

Conclusions: Compared to NMR, DXA has higher correlation for fat and lean mass (>95%), making it a more reliable imaging method to analyze body composition in small animals. Oligonol supplementation decreased OVX-induced fat mass gain without affecting lean mass. Taken together, DXA offers a rapid and reliable method for analyzing body composition in small animals and is suitable for long-term studies for evaluating effects of dietary supplementation of polyphenols.

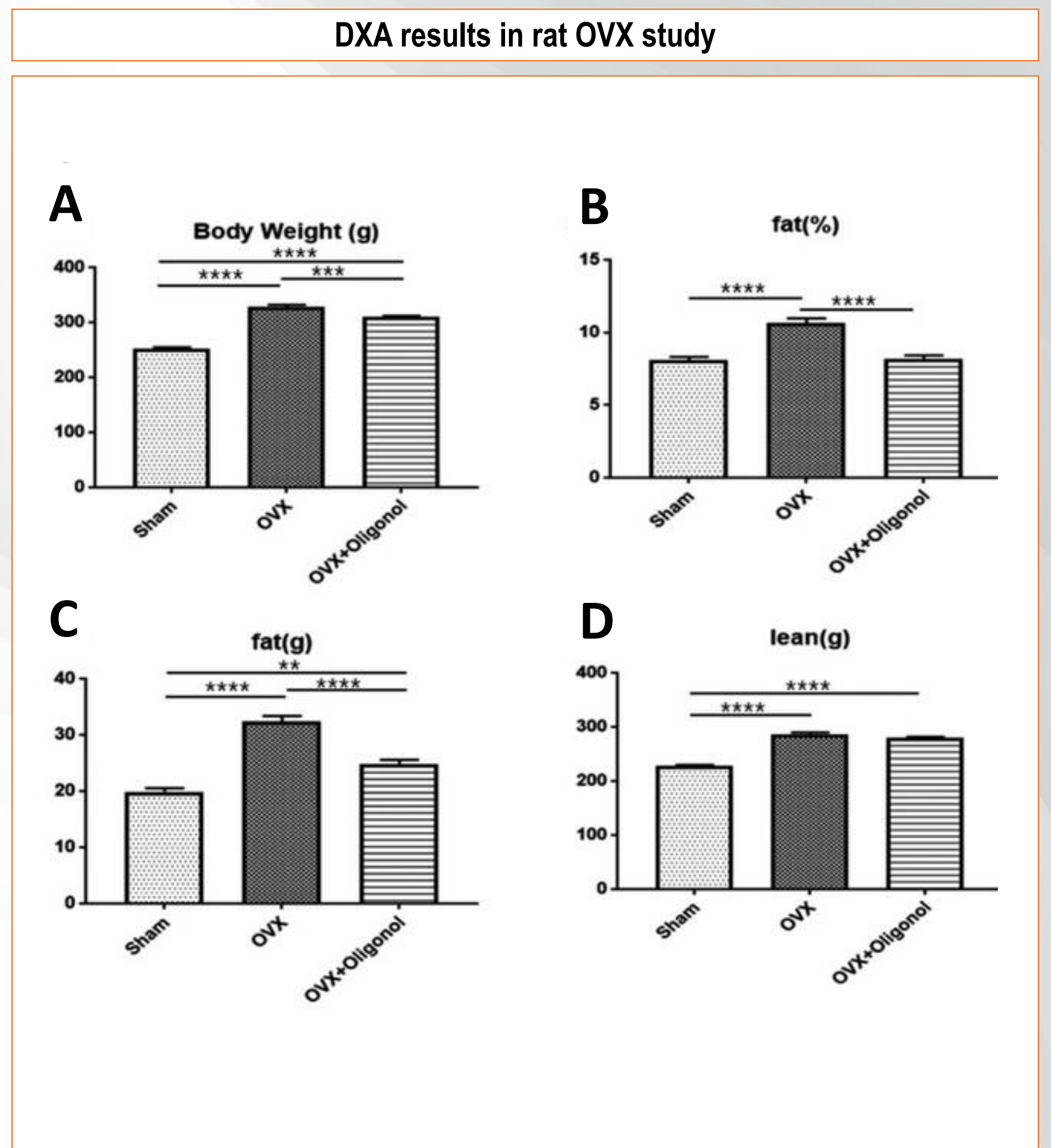


Figure 2: The following groups were included in the study: Sham operated and ovariectomized (OVX) rats, and OVX rats dosed intraperitoneally with the polyphenol oligonol 30 mg/kg daily. After 6 weeks A) body weight, B) fat percentage, C) fat mass (g) and D) lean mass (g) were analyzed with DXA.

Statistical significances are marked as * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, and **** $p < 0.0001$.

“DXA is a rapid and accurate imaging method that can be utilized in bone and metabolic research. Key advantages over other imaging methods include whole-body imaging capability and analysis of user-selected multiple ROIs during the study.”

References

1. Beak K-W 2020 Validation of Dual Energy X-ray Absorptiometry and Nuclear Magnetic Resonance in the Analysis of Body Composition in Mice. *JBM* 27(4):291-9.
2. Kim JH 2022 Effects of oligonol, a lychee-derived polyphenol, on skeletal muscle in ovariectomized rats by regulating body composition, protein turnover, and mitochondrial quality signalling. *Food Sci Nutr* 10(4):1184-94.



CONTACT INFORMATION & DISCLAIMERS

Tiina Kähkönen, PhD

tiina.kahkonen@oncobone.com

OncoBone is European distributor of the small-animal DXA iNSiGHT of OsteoSys. Read more at: <https://oncobone.com/insight-small-animal-dxa>

ONCOBONE
OsteoSys