

Effect of Bioplex Organic Trace Minerals on Copper, Manganese, and Zinc Status of the Canine

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Dog Trace Mineral Deficiencies

- **Copper (Cu)** – anemia, impaired skeletal growth
- **Manganese (Mn)** – impaired skeletal growth, reproductive failure
- **Zinc (Zn)** – dermatoses, hair depigmentation, growth retardation, reproductive failure

Case et al. (1995)

Objective of the Experiment

To compare serum, liver and hair concentrations of Cu, Zn and Mn when dogs are fed inorganic or organic (Bioplex) inorganic mineral sources.

Animals



- Adult hounds
- Mean weight 22.7 kg
- Fed once daily to meet calculated requirement for maintenance
- 10 animals per diet
- Diets fed for 24 weeks

Diet Nutrient Analyses

Commercially prepared dry diets. Minerals added as sulfates (Control) or as di-, tripeptides (Bioplex).

Diet ppm	Control (Sulfates)			Bioplex (Organic)		
	Cu	Mn	Zn	Cu	Mn	Zn
Total ^a	22	44	209	20	42	196
Added ^b	8	10	140	10	13	140

^a Both diets -- total trace mineral content by analysis

^b Bioplex diet by analysis, sulfate diet by calculation

LSU Survey of 19 Commercial Canine Diets (2001)

	Cu	Mn	Zn
Mean (ppm)	14.5	58	222
Range (ppm)	7-26	15-90	138-340

Control and Bioplex diets used in this study (Cu ~ 20, Mn ~ 40, and Zn ~200 ppm) were similar to commercial diets.

Procedures

■ Samples

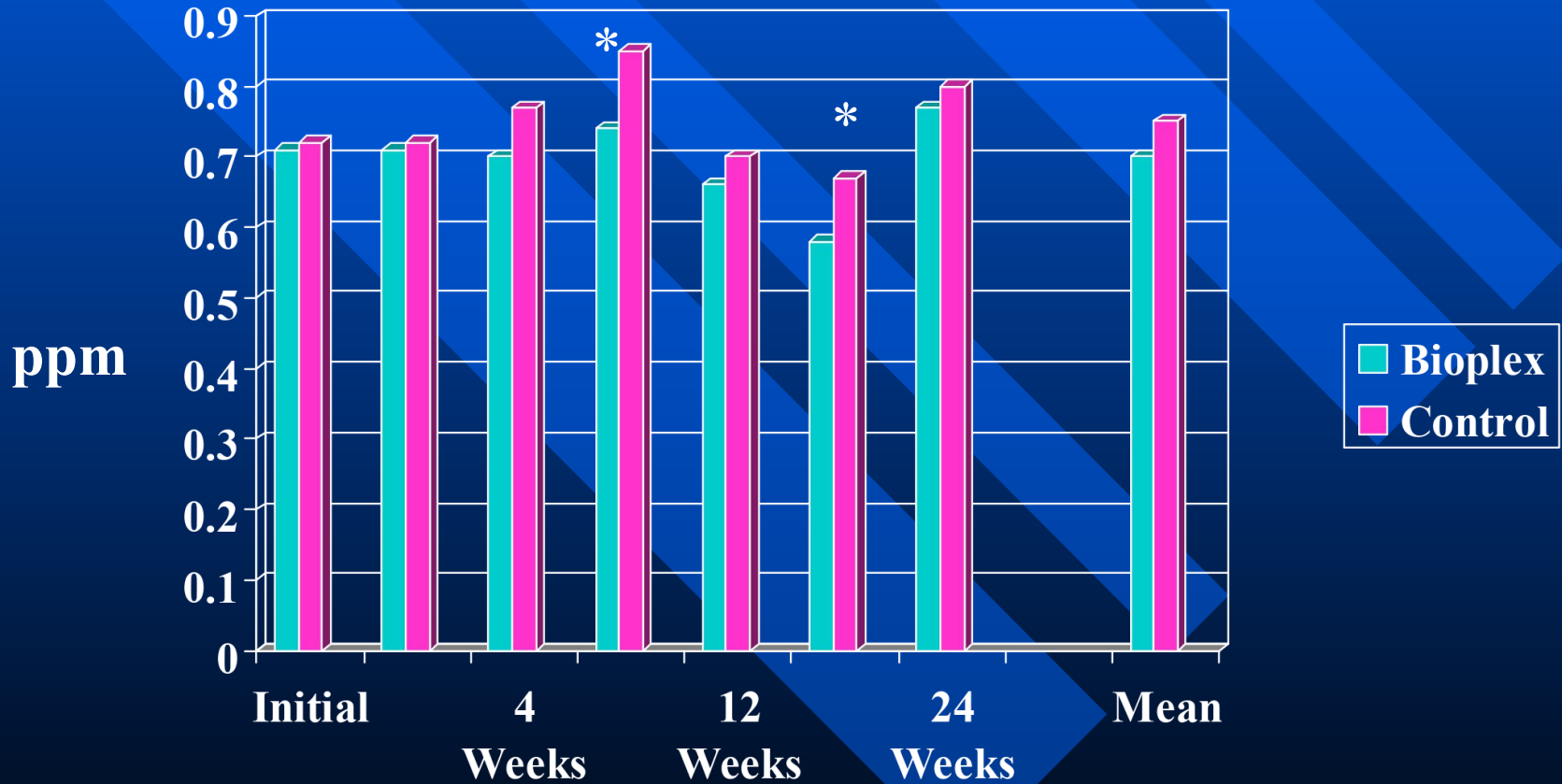
- Serum: Jugular at 0, 2, 4, 8, 12, 16, 24 wk
- Liver: Biopsies at 0, 12, and 24 wk
- Hair: 4, 8 and 12 weeks from location 1
12 and 24 weeks from location 2

Samples from both locations (on left side) are of new-growth hair following clipping.

■ Analytical methods

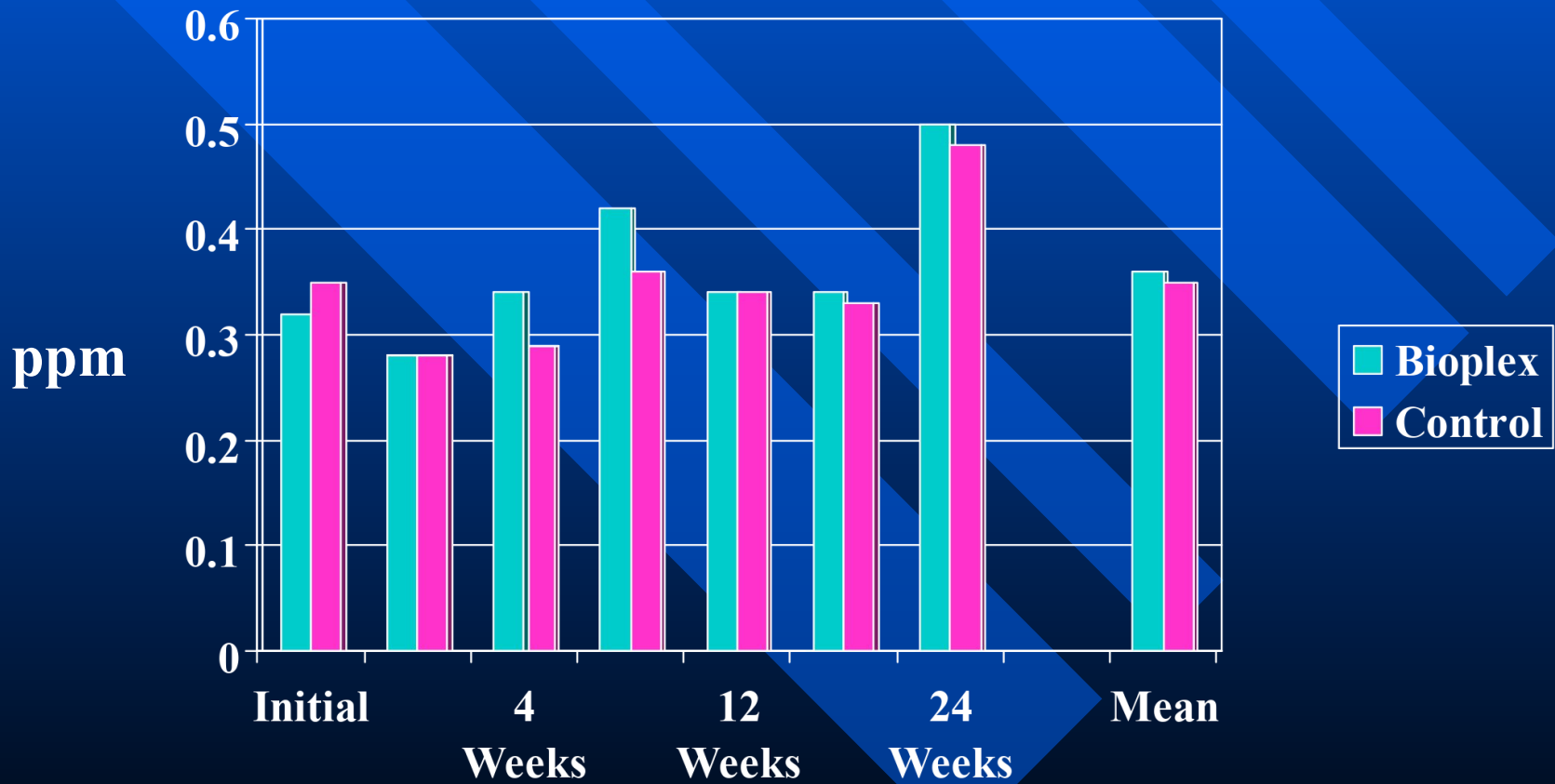
- Cu & Zn -- flame atomic absorption
- Mn -- graphite furnace atomic absorption

Serum Cu



*P<.01

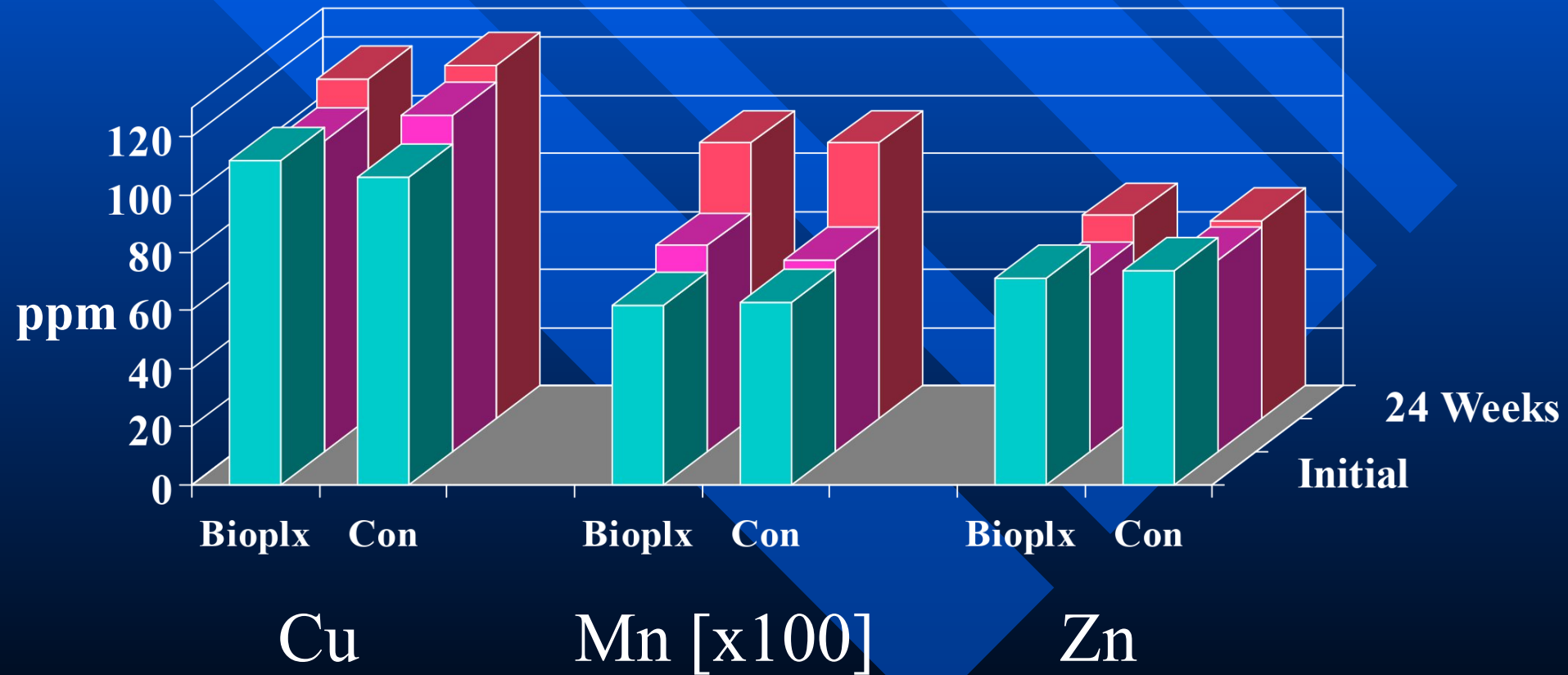
Serum Mn



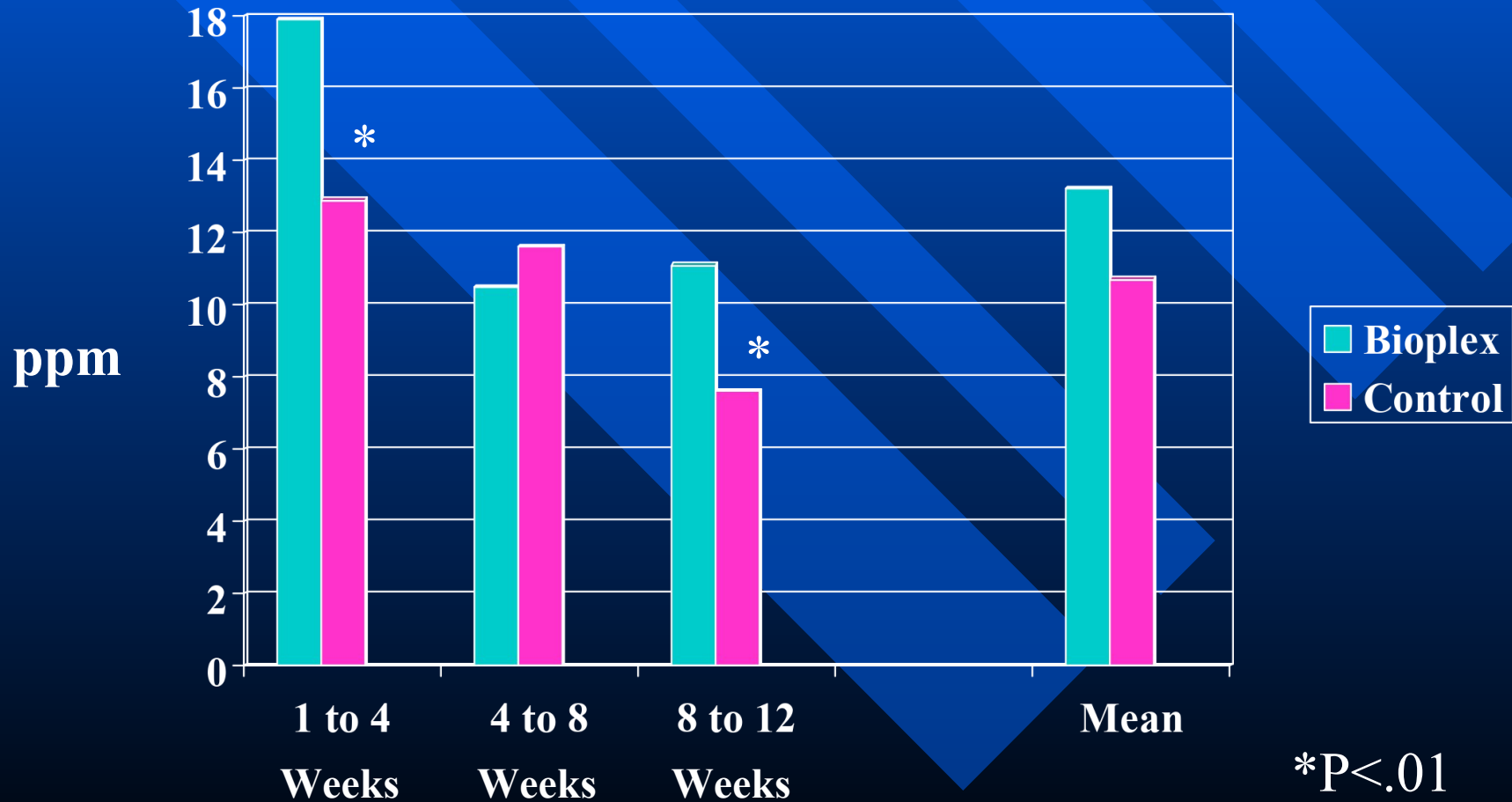
Serum Zn



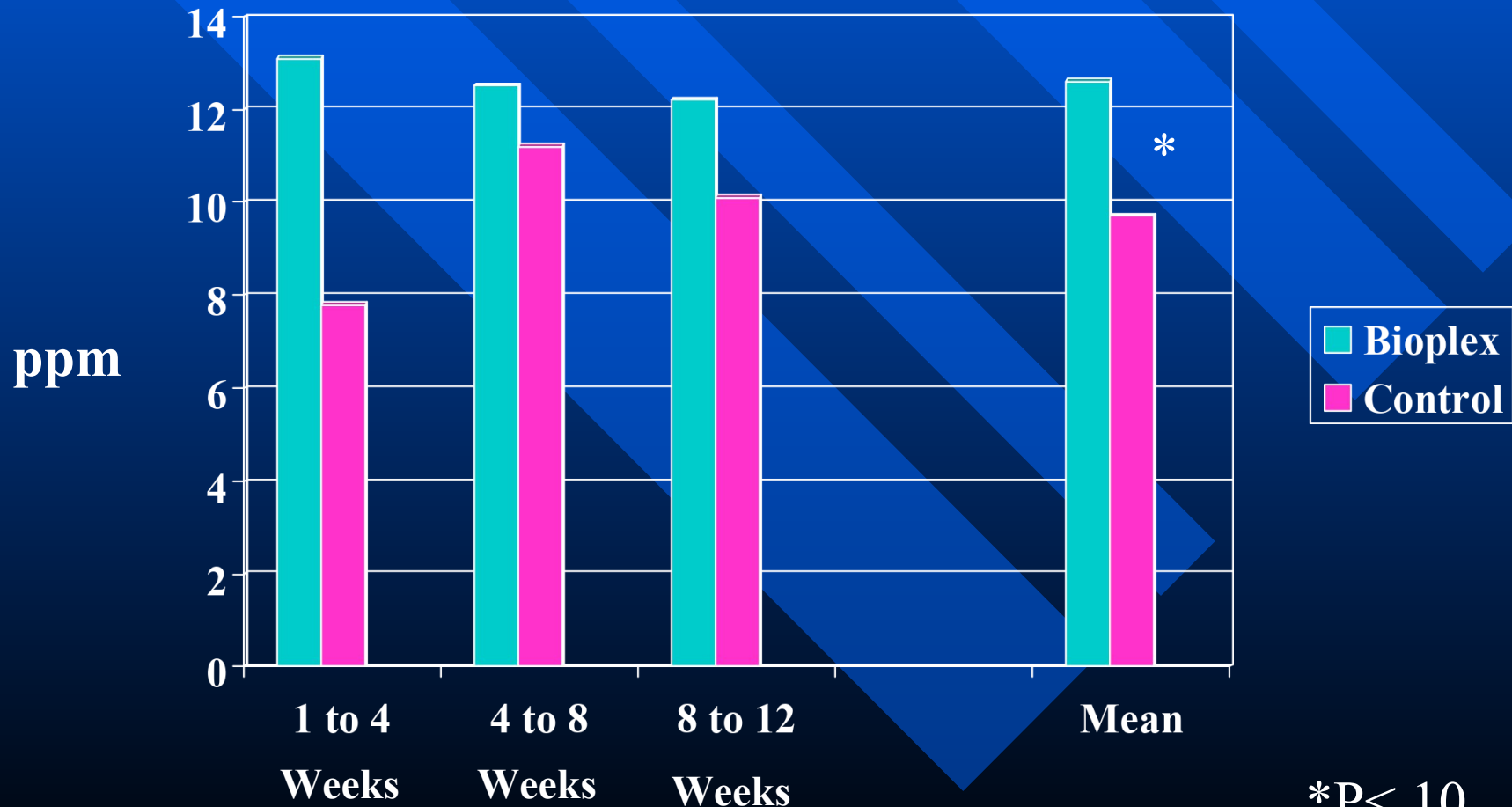
Wet Liver Minerals



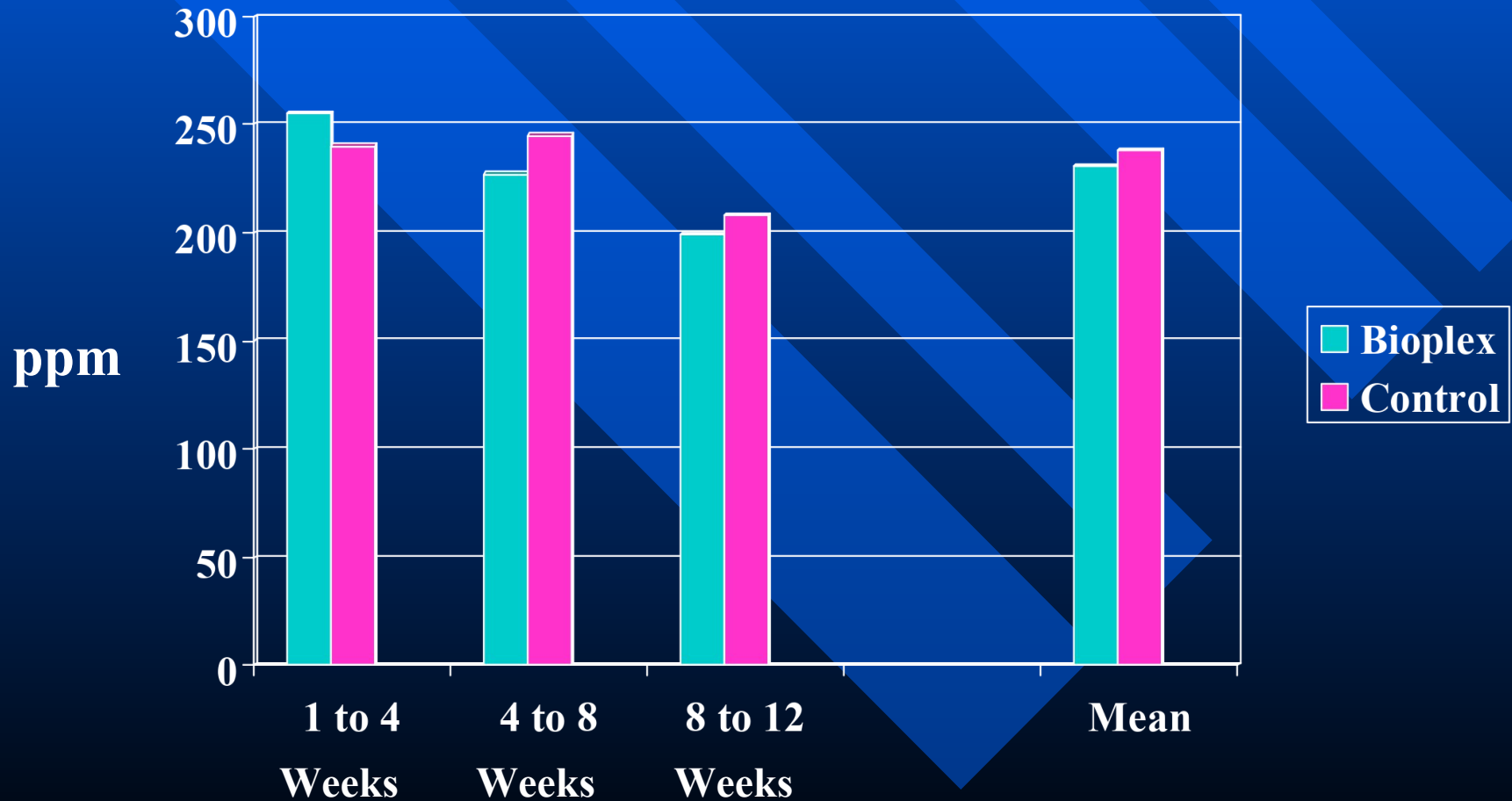
Hair Cu at End of Four Week Growth Periods



Hair Mn at End of Four Week Growth Periods



Hair Zn at End of Four Week Growth Periods



Conclusions

- Diet had no effect on mean serum Zn and Mn concentrations.
- Serum concentrations of Cu were lower in dogs receiving Bioplex minerals than in the controls.
- Diet had no effect on liver concentrations of Cu, Zn or Mn.

Conclusions

- Diet had no effect on hair Zn concentration.
- Mean hair Mn was significantly higher for the Bioplex diet.
- Hair Cu was significantly higher for the Bioplex diet at the 1-4 and 8-12 week sampling periods.

Implications

This study indicate that there is a difference in the tissue uptake, distribution and/or utilization of minerals between organic and inorganic mineral sources.