Relation of tubular dysfunction marker levels with cadmium in urine in non-polluted areas in Japan

--- Tri-phasic dose-response relationship ---

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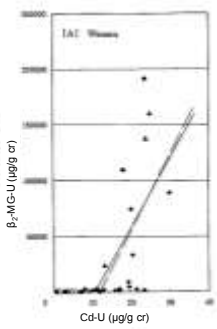

Relationship between urinary Cd - tubular dysfunction markers (e.g., β_2-MG)

Traditionally considered as in the shape of 'hockey stick", i.e., biphasic

Ikeda et al.
Toxicol Lett 137, 135, 2003

Is the relation linear in the blade range?

Database

Cd, α_1-MG, β_2-MG, NAG in urine of **17468** adult women in non-polluted areas in Japan

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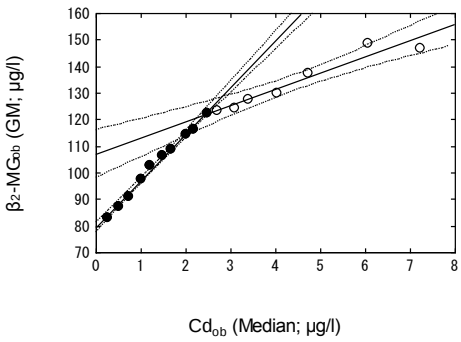
Age: 50 - 59 years
Smoking: Never-smoking
Sp. Gr.: 1.010 - 1.030
CR: 0.3 - 3.0 g/l

↓

5306 cases were available

Basic parameters

	No. of cases	GM		GSD
Cd_{ob}	5,306	1.55	μg/l	2.16
α_1-MG_{ob}	5,306	2.16	mg/l	2.34
β_2-MG_{ob}	5,306	96	μg/l	1.93
NAG_{ob}	1,444	3.94	U./l	1.95

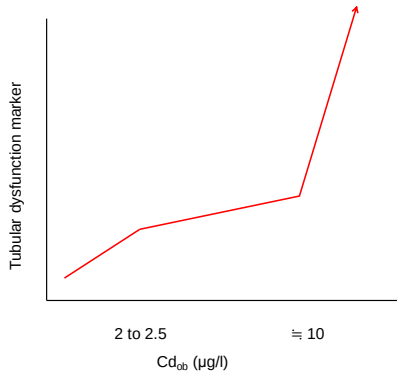


Similar two-phase results with α_1-MG, β_2-MG and NAG

Parameter	Regression line								Cross (Cd in μg/l)
	Cd≦2.5 μg/l				Cd>2.5 μg/l				
	n	Inter-cept	Slope	r	n	Intercept	Slope	r	
α_1-MG_{ob} (GM; mg/l)	10	1,47	0,84	0,997	7	2,95 **	0,20 **	0,966 ns	2,3
β_2-MG_{ob} (GM; μg/l)	10	79	17,60	0,996	7	107 **	6,06 **	0,965 ns	2,4
NAG_{ob} (GM; U./l)	10	1,39	1,35	0,996	7	2,26 **	0,70 **	0,981 ns	1,3

Conclusions

1. In non-exposed populations, the exposure - effect relationship is not simply linear.
2. The relation at low-level Cd is in two phases, with a point of flexion near Cd = ca. 2.3-2.4 µg/l.
3. The over-all relation is in fact tri-phasic.



¡ MUCHAS GRACIAS
POR SU ATENCIÓN !