

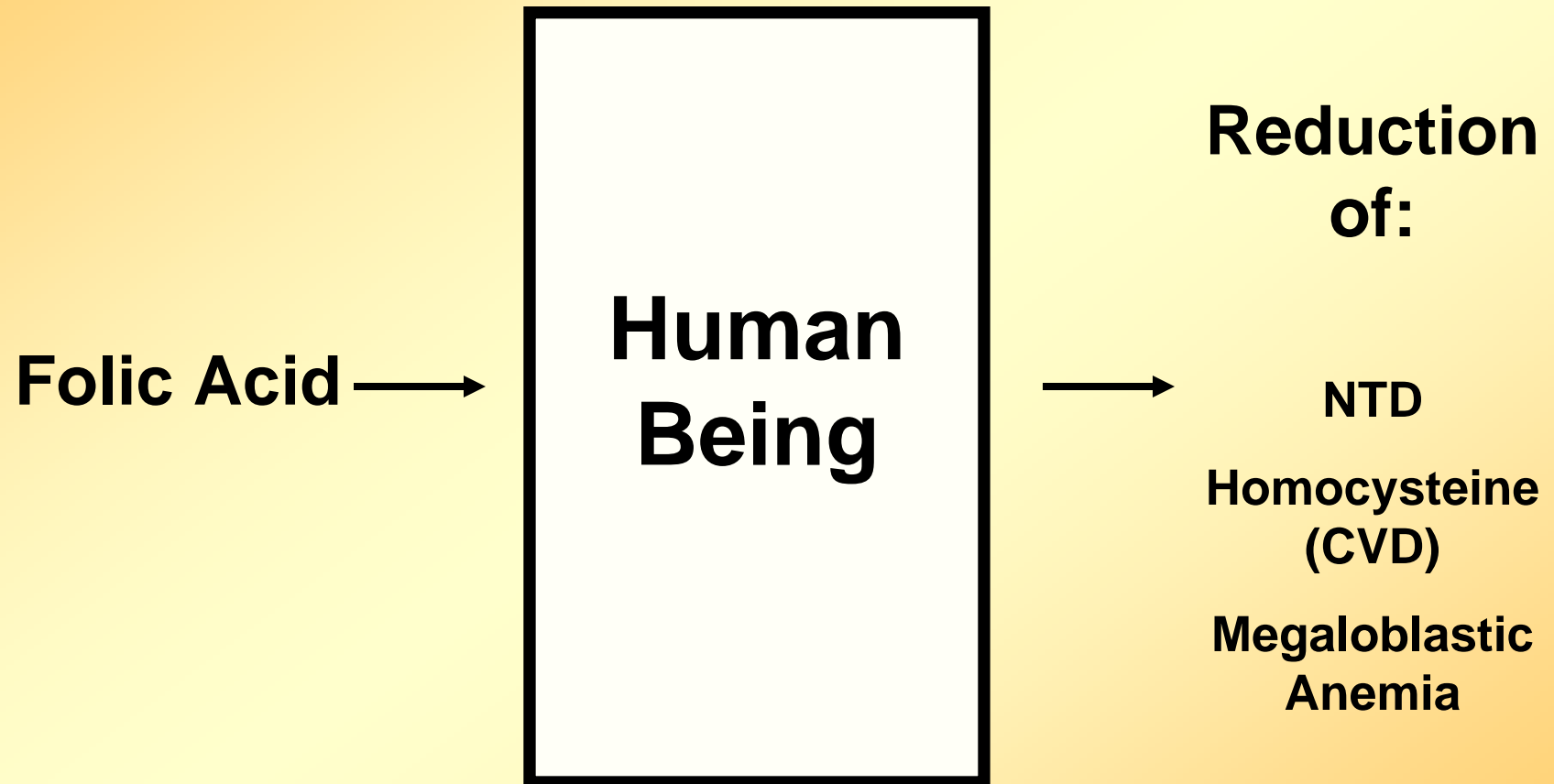
Lessons Learned from Folic Acid Interventions as Applicable to Food Fortification

Omar Dary, Ph.D.

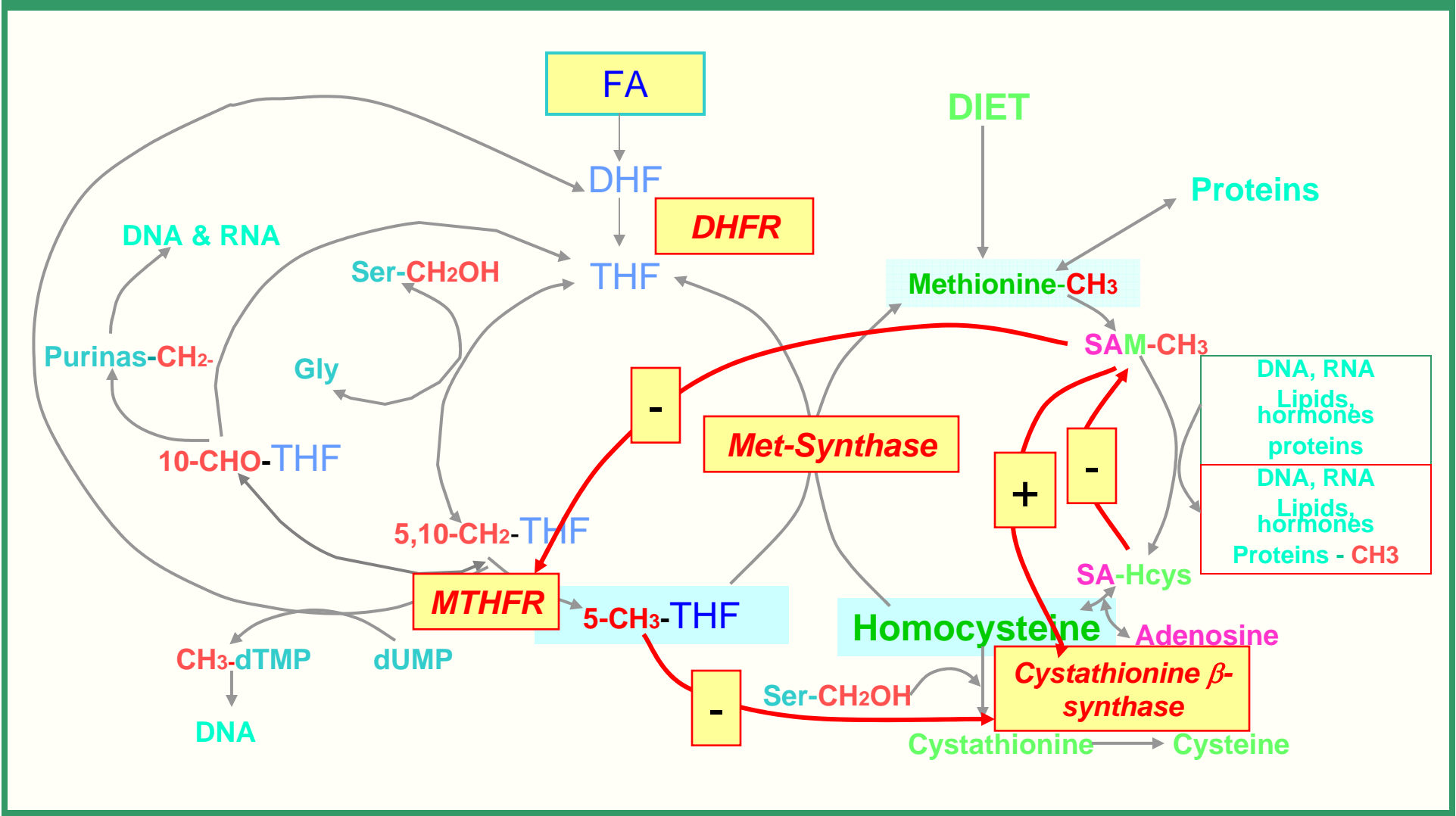
A2Z/The USAID Micronutrient and Child Blindness Project



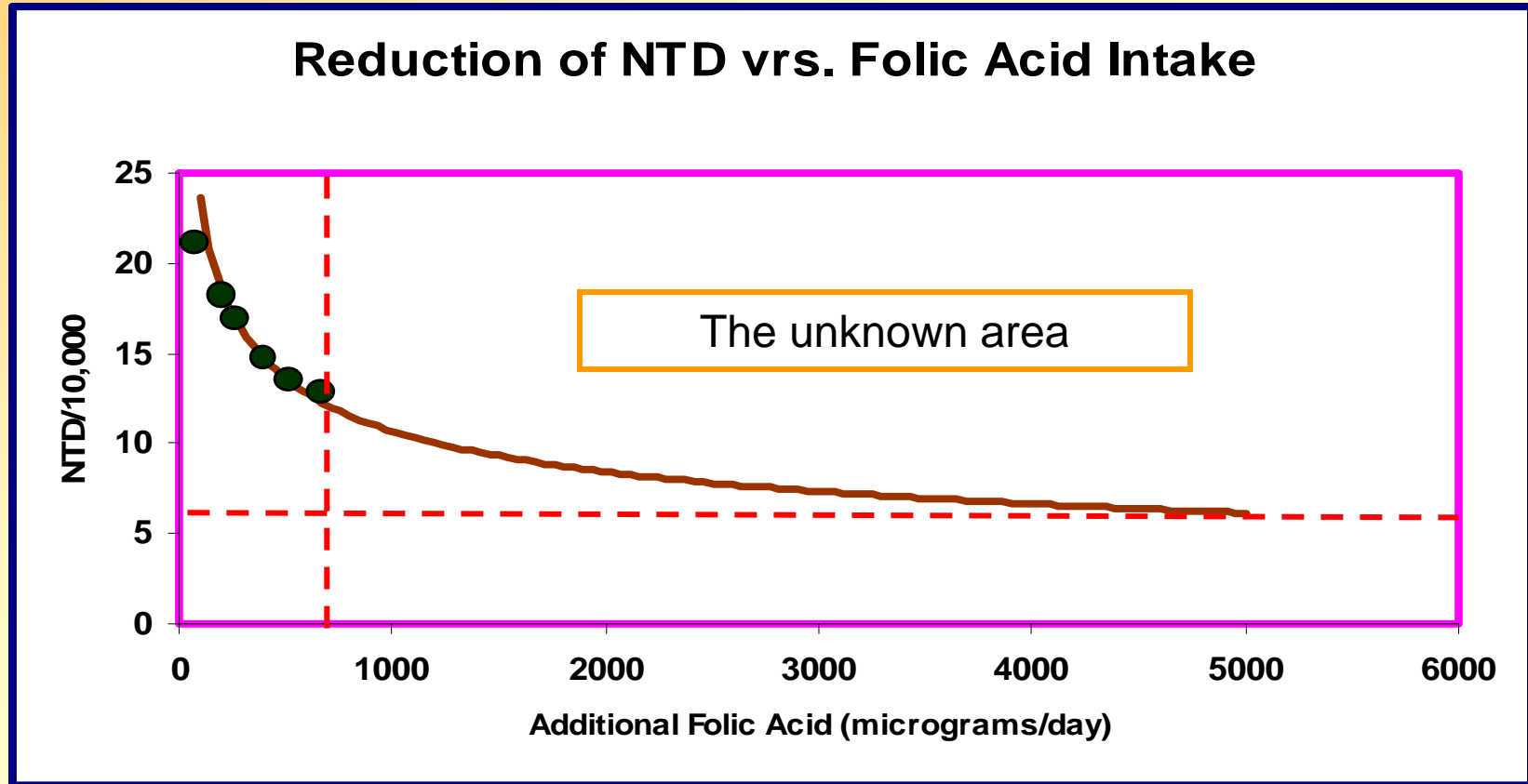
Effects attributed to Folic Acid



Enzyme polymorphisms and regulations

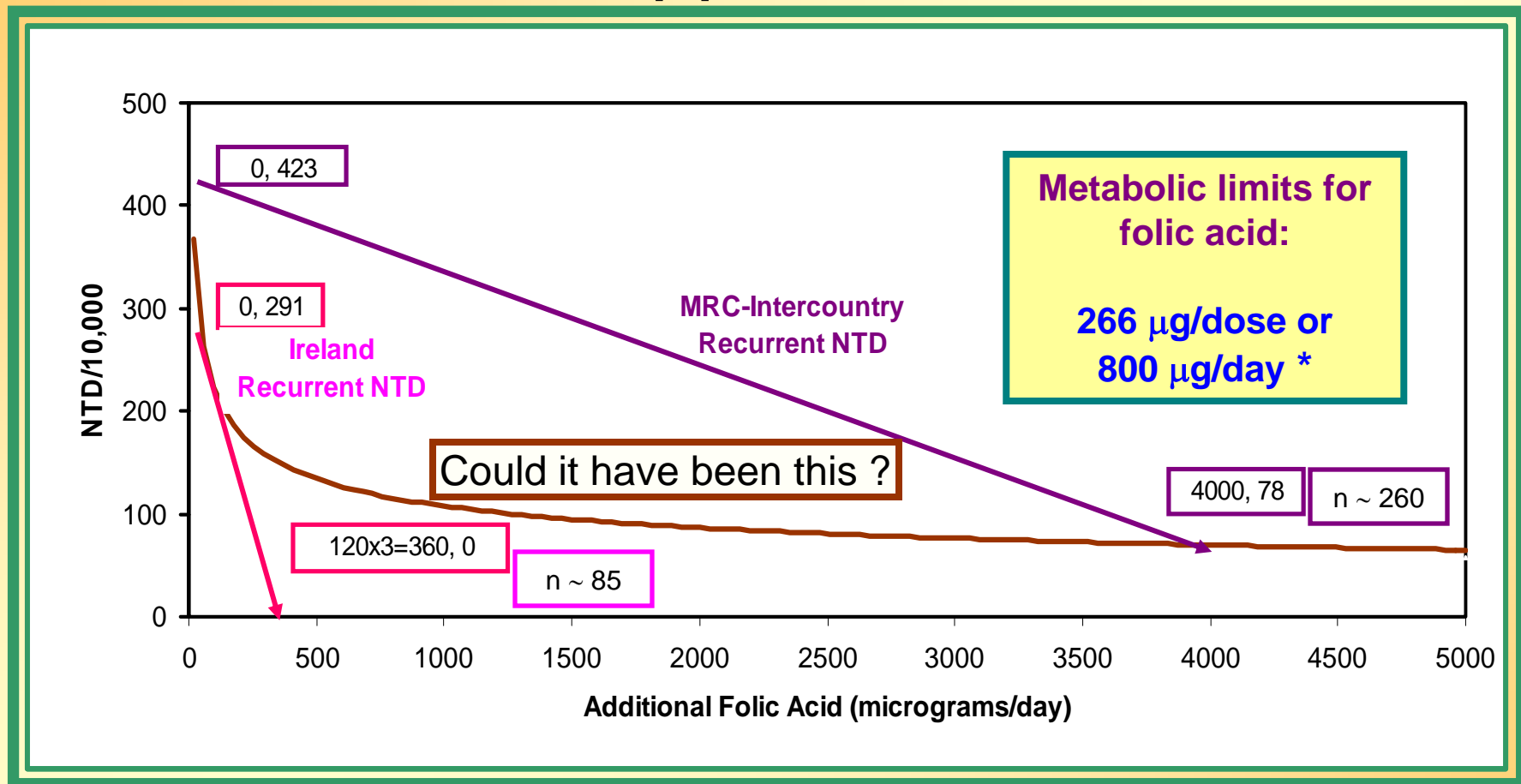


Reduction of NTD's follows a "saturable" pattern



Based on: Daly LE et al. *J Am Me Sci* 1995; **274**:1698;
and Daly S et al. *Lancet* 1997; **350**:1666.

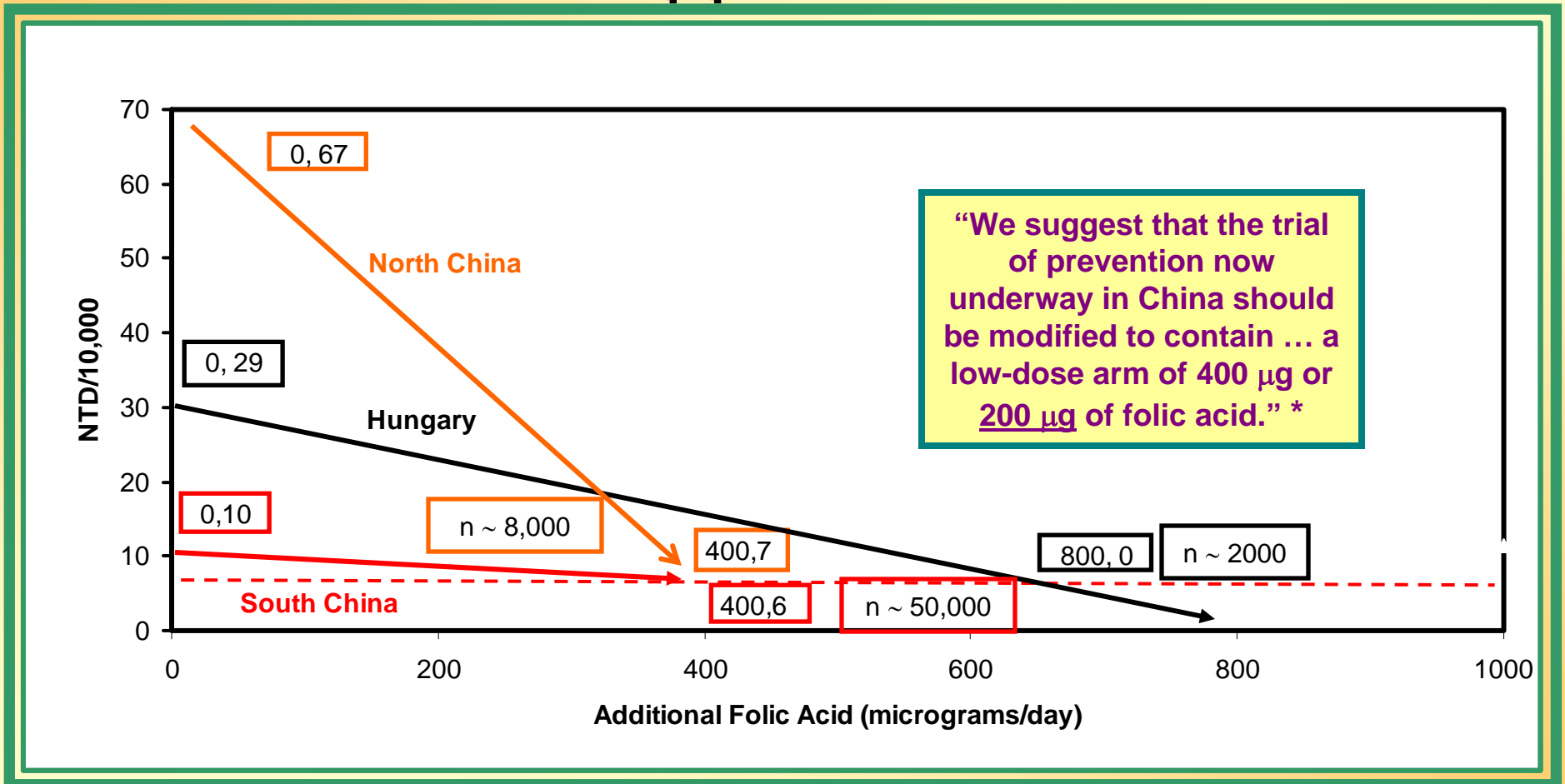
Reduction of recurrent NTD by folic acid supplementation



References: MRC – *Lancet* 1991;**338**:131.
 Ireland: Kirke et al. *Arch Dis Child* 1992;**67**:1442.
 * Kelly et al. *Am J Clin Nutr* 1997;**65**:1790.

OD-2007-13-MF-Folic Acid

Preventive reduction of NTD by Folic Acid Supplementation



References:

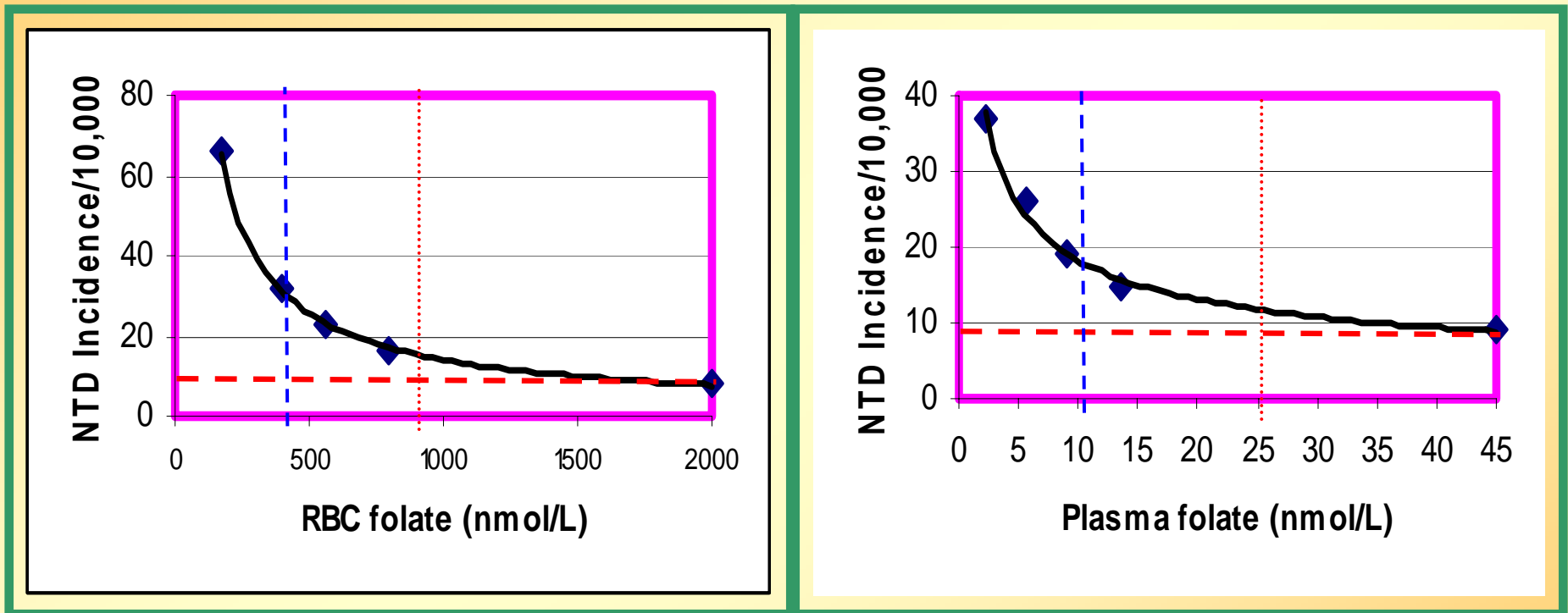
Hungary: Czeizel and Dudás *N Engl J Med* 1992;**327**:1832.

China: Berry et al. *N Engl J Med* 1999;**341**:1485.

* Scott JM et al. *Lancet* 1991;**338**:505.

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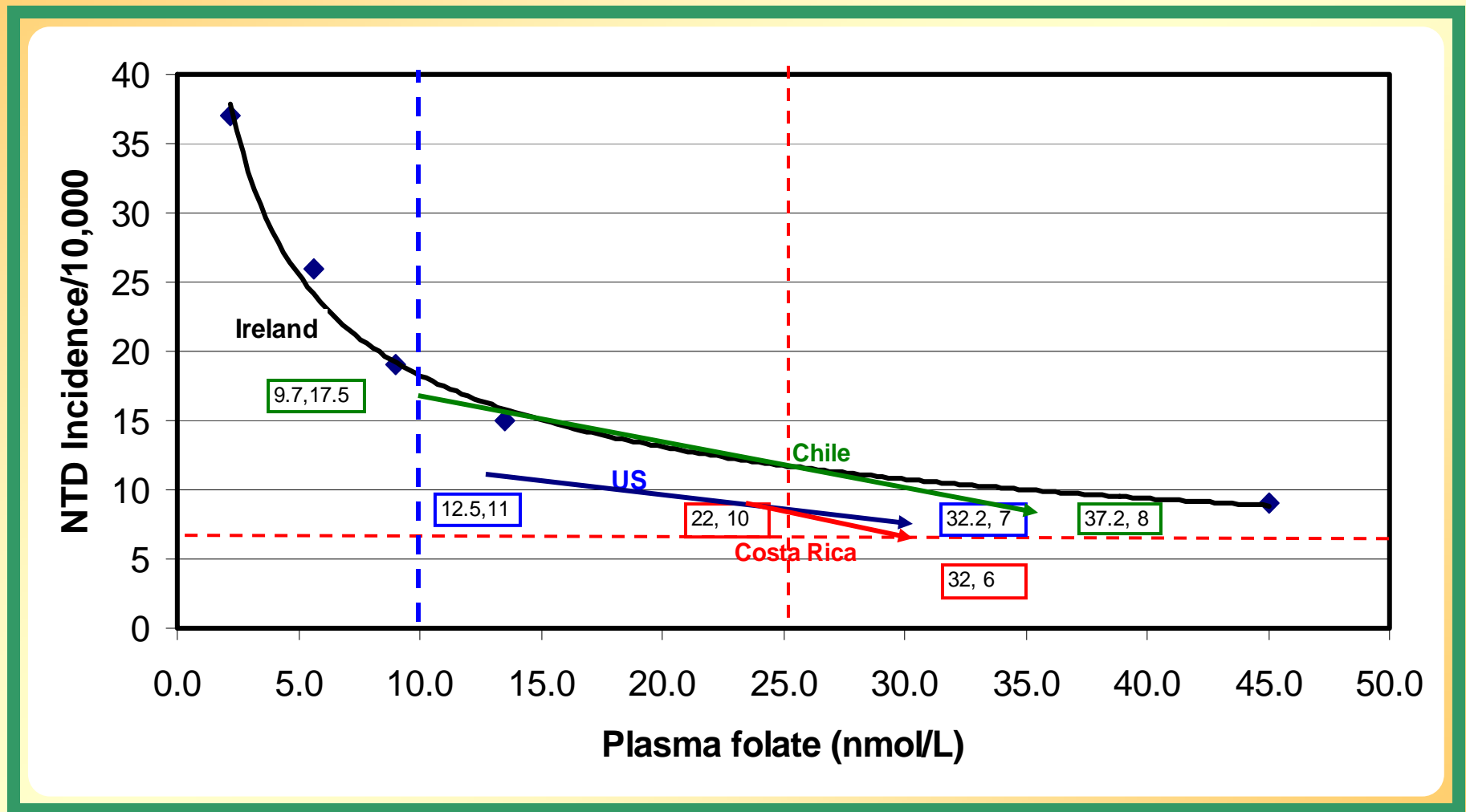
Association between RBC-folate and serum-folate and NTD prevalence



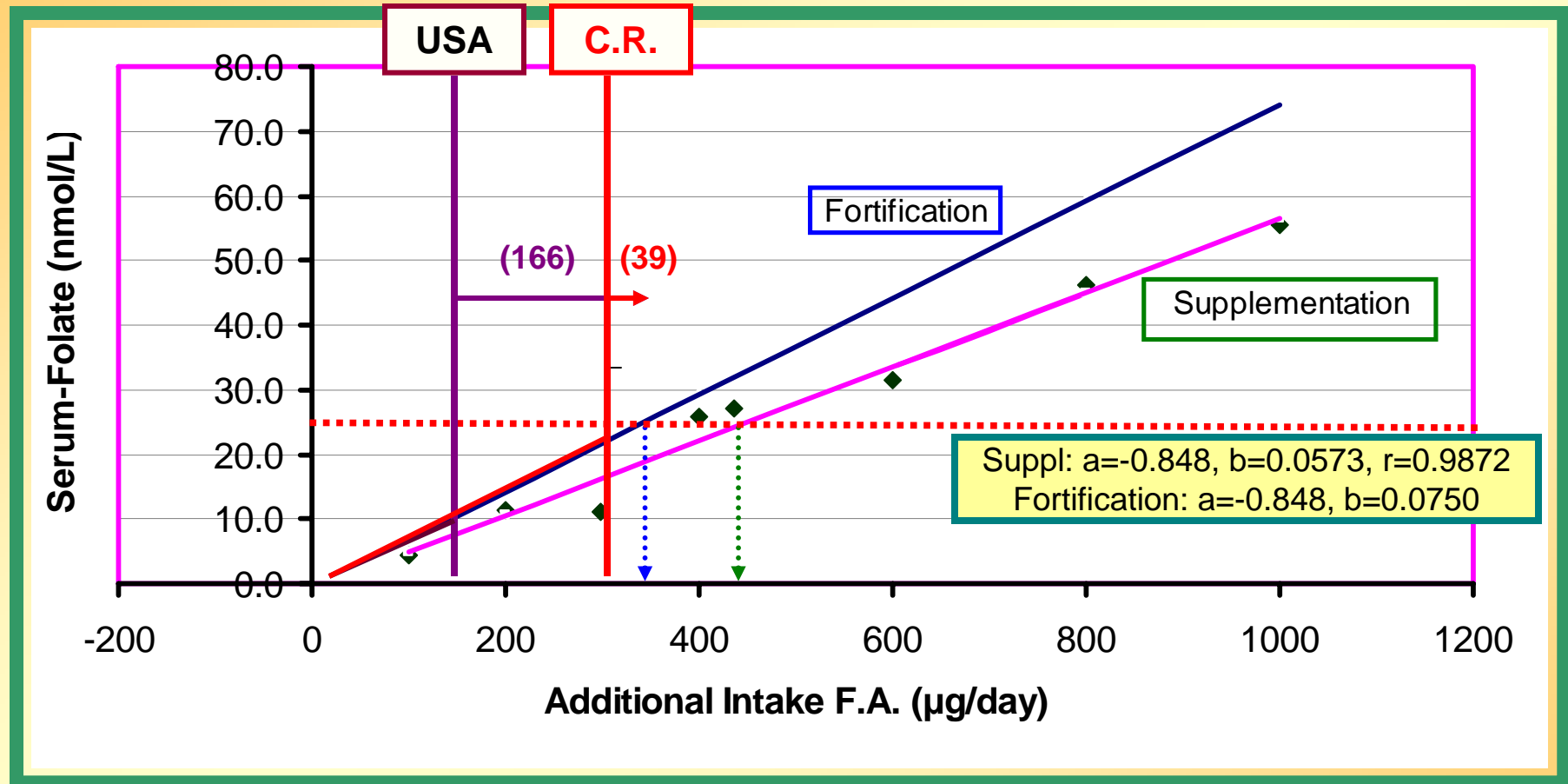
Reference: Daly LE et al., *J Am Med Sci* 1995;**274**:1698-1762.

Data from Ireland.

Plasma-folate and reduction of NTD by folic acid fortification



Increase of serum-folate at different intakes of folic acid



Supplementation curve based on data from Quinlivan and Gregory, *Am J Clin Nutr* 2003;**77**:221-25. Collection of several studies.

Estimations using serum folate in three food fortification programs

Country	Serum folate (nmol/L)		Estimated Basal Folate Intake ($\mu\text{g/day DFE}$)*	Additional Folic Acid Intake ($\mu\text{g/day}$)		
	Basal	Final		Claimed	Estimated	To reach 25 nmol/L
Costa Rica	22.0	32.0	518	100	145	39
USA	12.5	32.2	303	~ 200	274	166
Chile	9.7	37.2	240	427	378	203

*** DRI Values of folate for adults:**

EAR: 320 $\mu\text{g/day DFE}$

RNI: 400 $\mu\text{g/day DFE}$