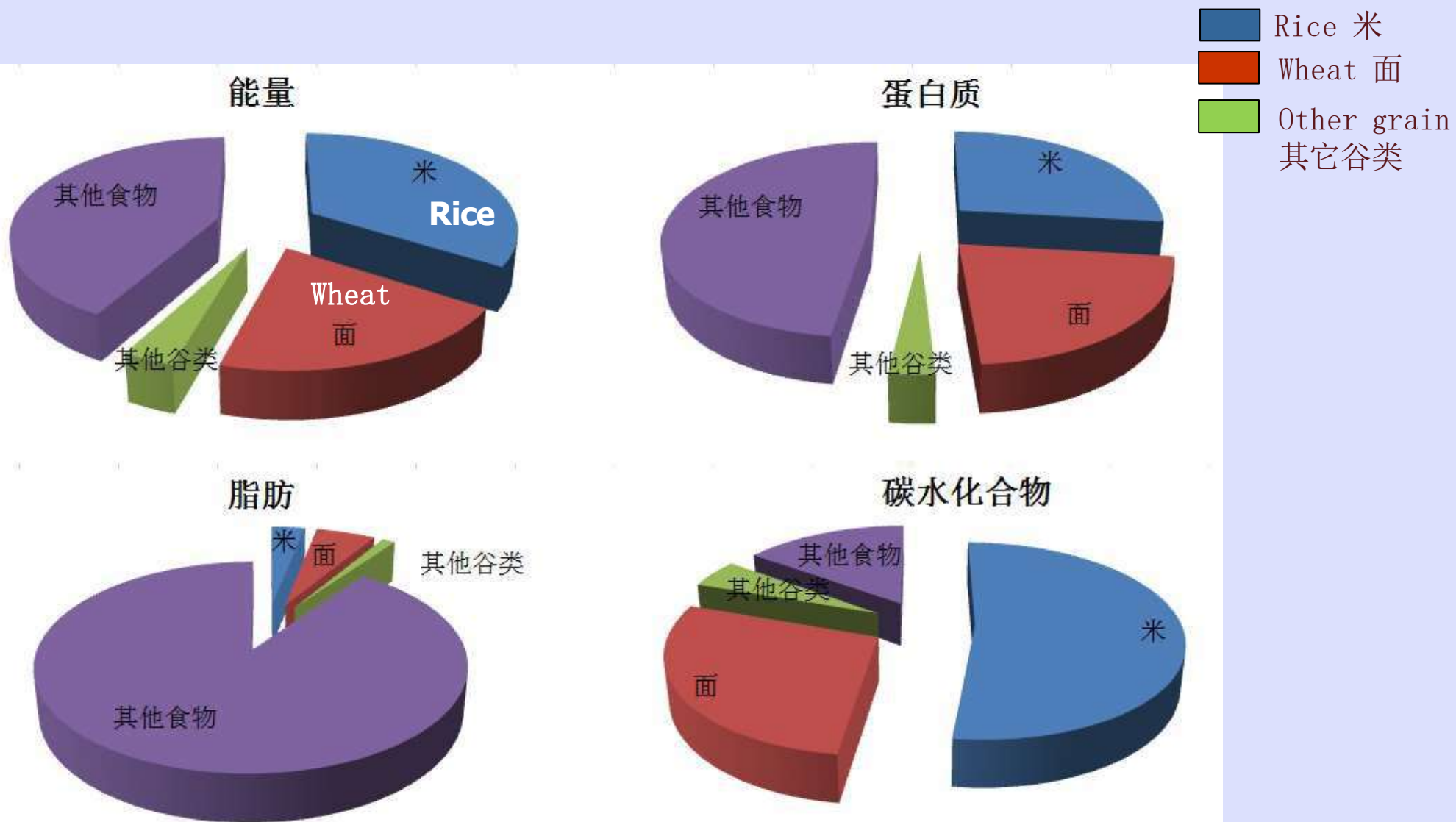
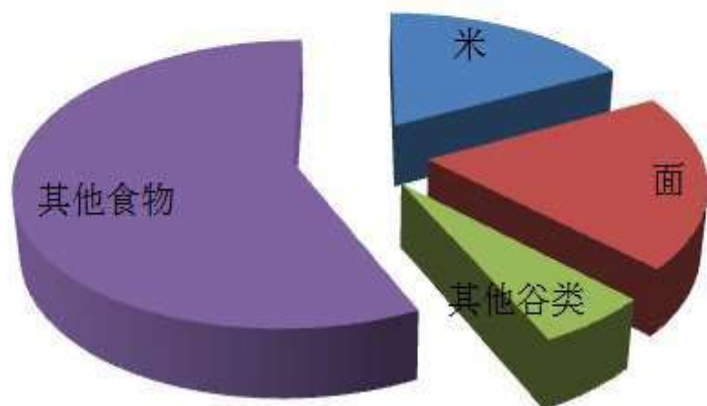


谷类食物是能量和宏量营养素的重要来源

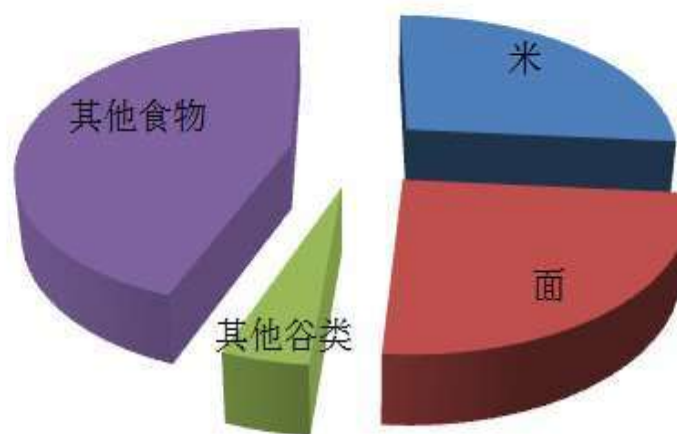


谷类食物是膳食纤维和B族维生素的重要来源

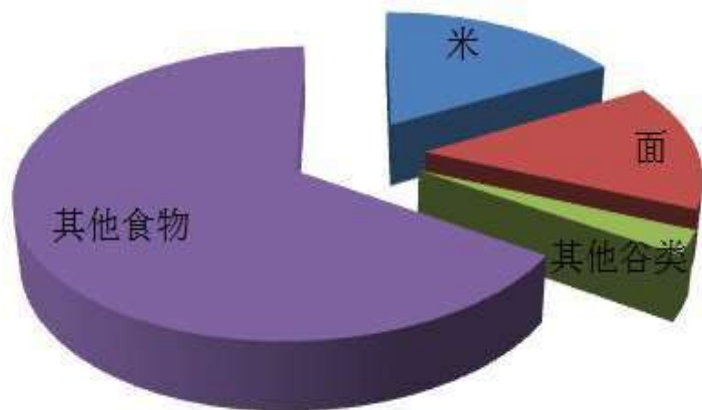
膳食纤维 **Fiber**



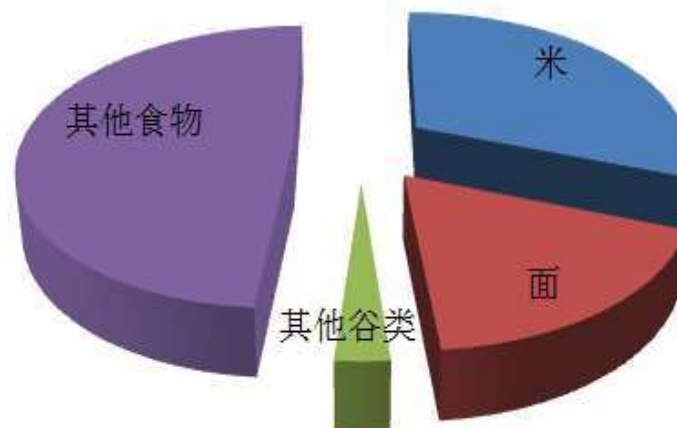
维生素B1 **Vit B1**



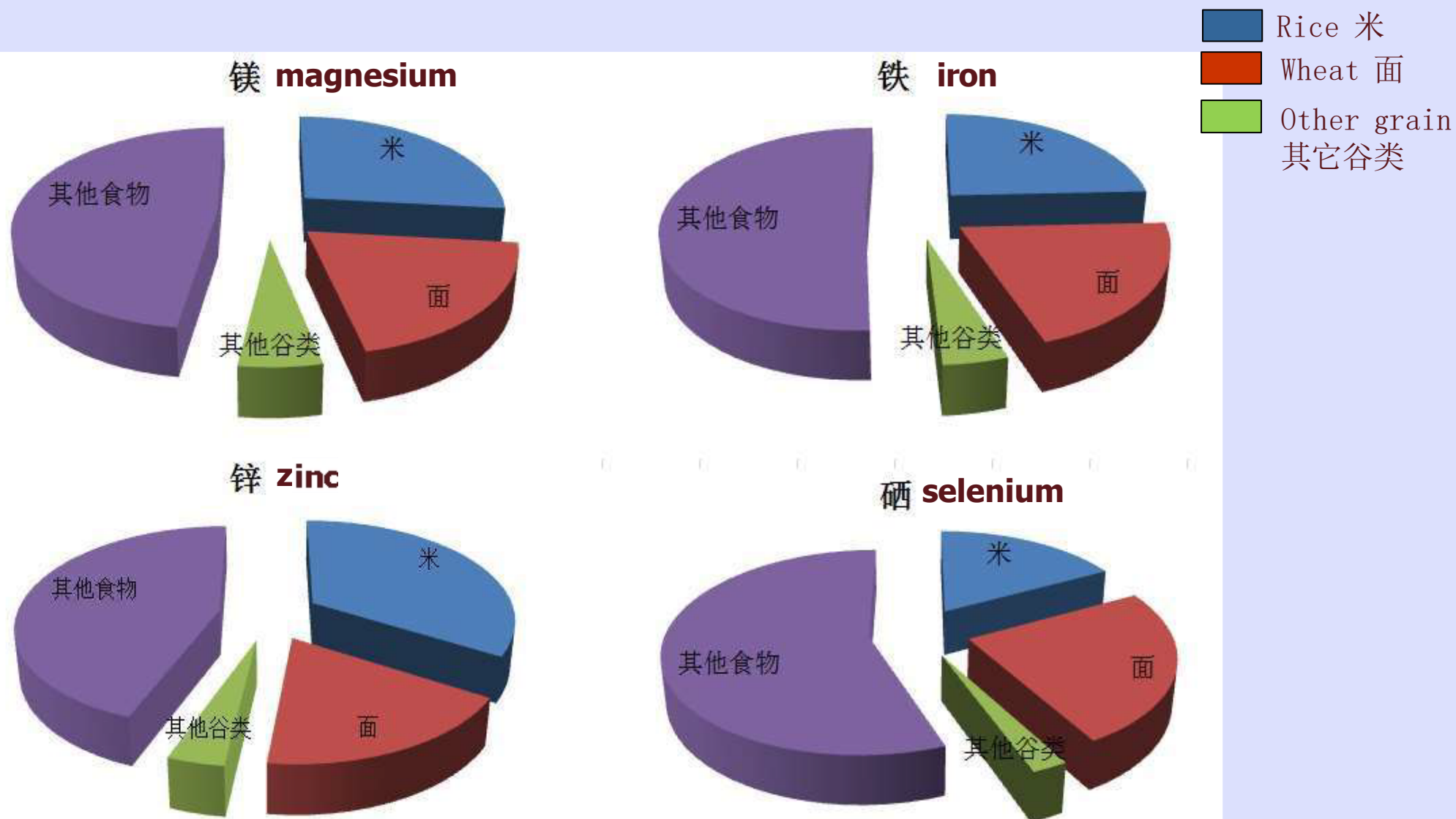
维生素B2 **Vit B2**



烟酸 **Niacin**



谷类食物是矿物质和微量元素的重要来源



全谷物的定义

Whole Grain Council, USA

- Whole grains or foods made from them contain all the essential parts and naturally-occurring nutrients of the **entire grain seed**. If the grain has been processed (e.g., cracked, crushed, rolled, extruded, and/or cooked), the food product should deliver approximately the same rich balance of nutrients that are found in the original grain seed.

American Association of Cereal Chemists, AACC

- whole grains shall consist of the intact, ground, cracked or flaked caryopsis, whose principal anatomical components – the starchy endosperm, germ and bran (Fig. 1) – are in the same relative proportion as they exist in the **intact caryopsis**.

FDA

- Cereal grains that consist of the intact, ground, cracked or flaked caryopsis, whose principal anatomical components - the starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the **intact caryopsis** - should be considered a whole grain food. Cereal grains may include amaranth, barley, buckwheat, bulgur, corn (including popcorn), millet, quinoa, rice, rye, oats, sorghum, teff, triticale, wheat, and wild rice.

全谷物的定义

EU Healthgrain

Whole grains shall consist of the intact, ground, cracked or flaked kernel after the removal of inedible parts such as the hull and husk. The principal anatomical components - the starchy endosperm, germ and bran - are present in the same relative proportions as they exist in the intact kernel.

Small losses of components - i.e. less than 2% of the grain/10% of the bran - that occur through processing methods consistent with safety and quality are allowed.

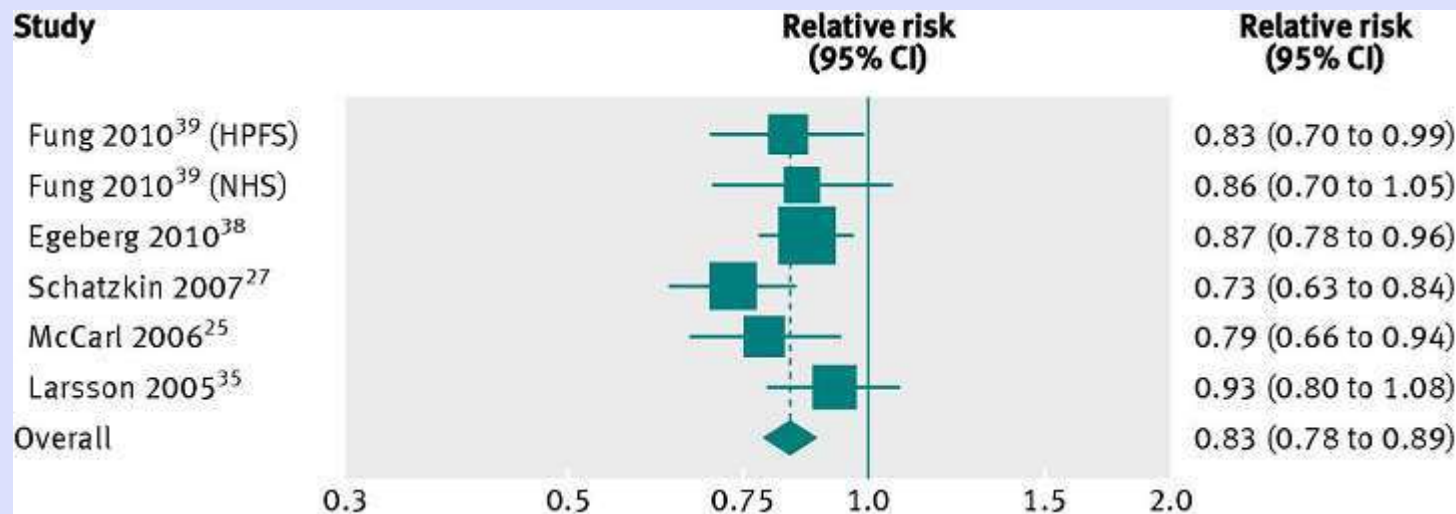
Temporary separation of whole grain constituents during processing for later bination is acceptable.

bination of the endosperm, bran and germ takes into account that there are variations in the ratio of endosperm, bran and germ between kernels in one ear and between varieties of one type of grain. bination per grain and per variety will result in some fluctuations in the ratios of endosperm, bran and germ between batches of flour and products. There should, however, be no significant nutritional losses, and differences should be no greater than

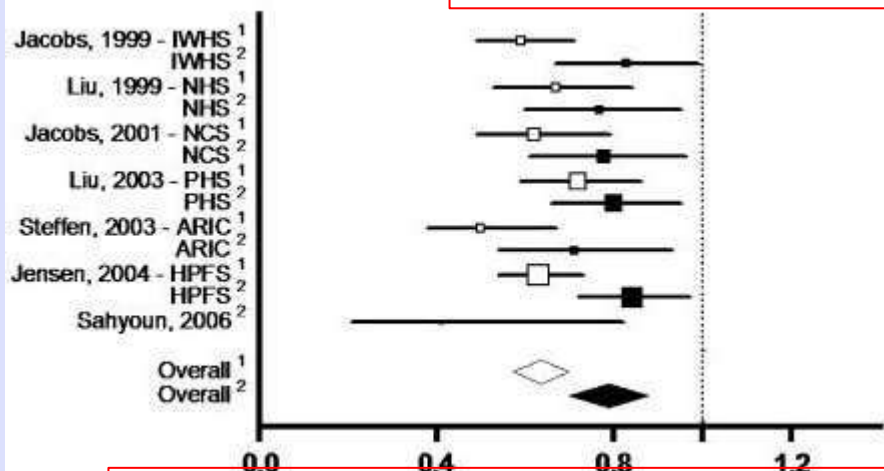
全谷物的健康益处

- ❑ 降低心血管疾病风险 Reduce CVD risk
 - ❑ 降低代谢综合征、II 型糖尿病风险
reduce risks of metabolic syndrome, Type II diabetes
 - ❑ 降低某些癌症风险（大肠癌，食道癌）
Reduce risks of cancer (colorectal and Esophageal cancer)
 - ❑ 改善肠道功能 Improve function of GI track
 - ❑ 减缓食物消化、增加饱腹感、控制体重
slower digestion, full filling, weight control
 - ❑ 有益口腔健康 dental health
- by ILSI, FAO, FDA, USDA, EFSA

全谷类摄入与慢性代谢性疾病风险

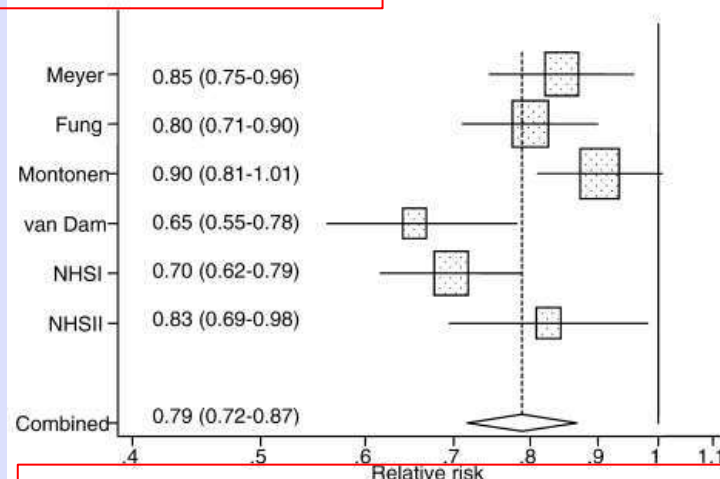


↑ 3servings/d, ↓ risk of colorectal cancer 27% Aune *et al.*, 2011



2.5 ser/d vs. 0.2ser/d, ↓ risk of CVD 21%

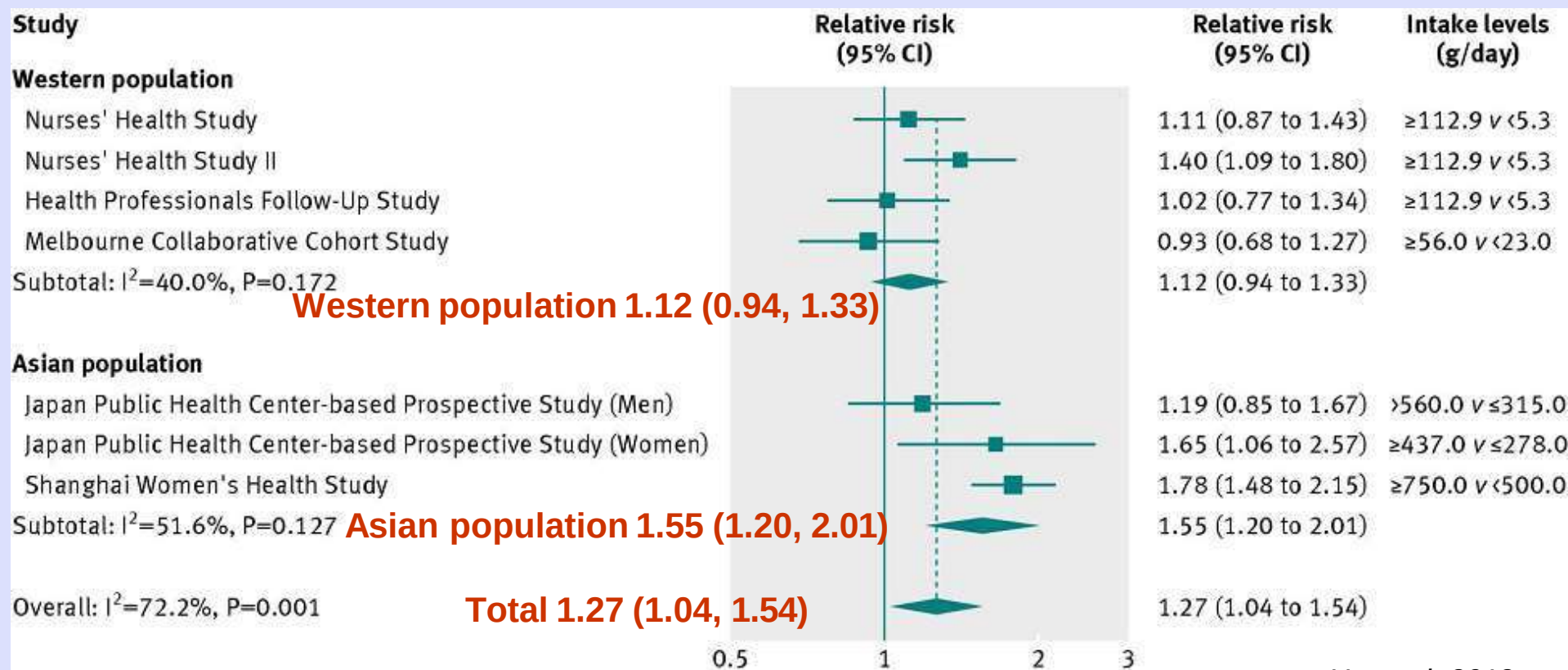
Mellen *et al.*, 2008



↑ 2ser/d, ↓ risk of type II diabetes 21%

de Munter *et al.*, 2007

精白米摄入与2型糖尿病风险



Hu et al. 2012

随着精白米摄入增加，二型糖尿病危险增高，
亚洲人群风险更高

研究方法

以糙米和全麦粉替代精白米和精白面粉

▣ 替代50 % 现有谷物的摄入

- 依据膳食摄入指南和营养素参考摄入量

▣ 参考数据库:

- 2010 national nutrition and health survey data, China CDC
- 2004 China food composition, China CDC
- 2009 US food composition, USDA SR 21

研究对象

面粉 wheat flour

- 精面粉 Wheat flour, white, no fortification
- 标准粉 Flour, standard grade
- 全麦面粉 Wheat flour, whole-grain (USA)

米 rice

- 精米 White Rice
- 糙米 Brown rice

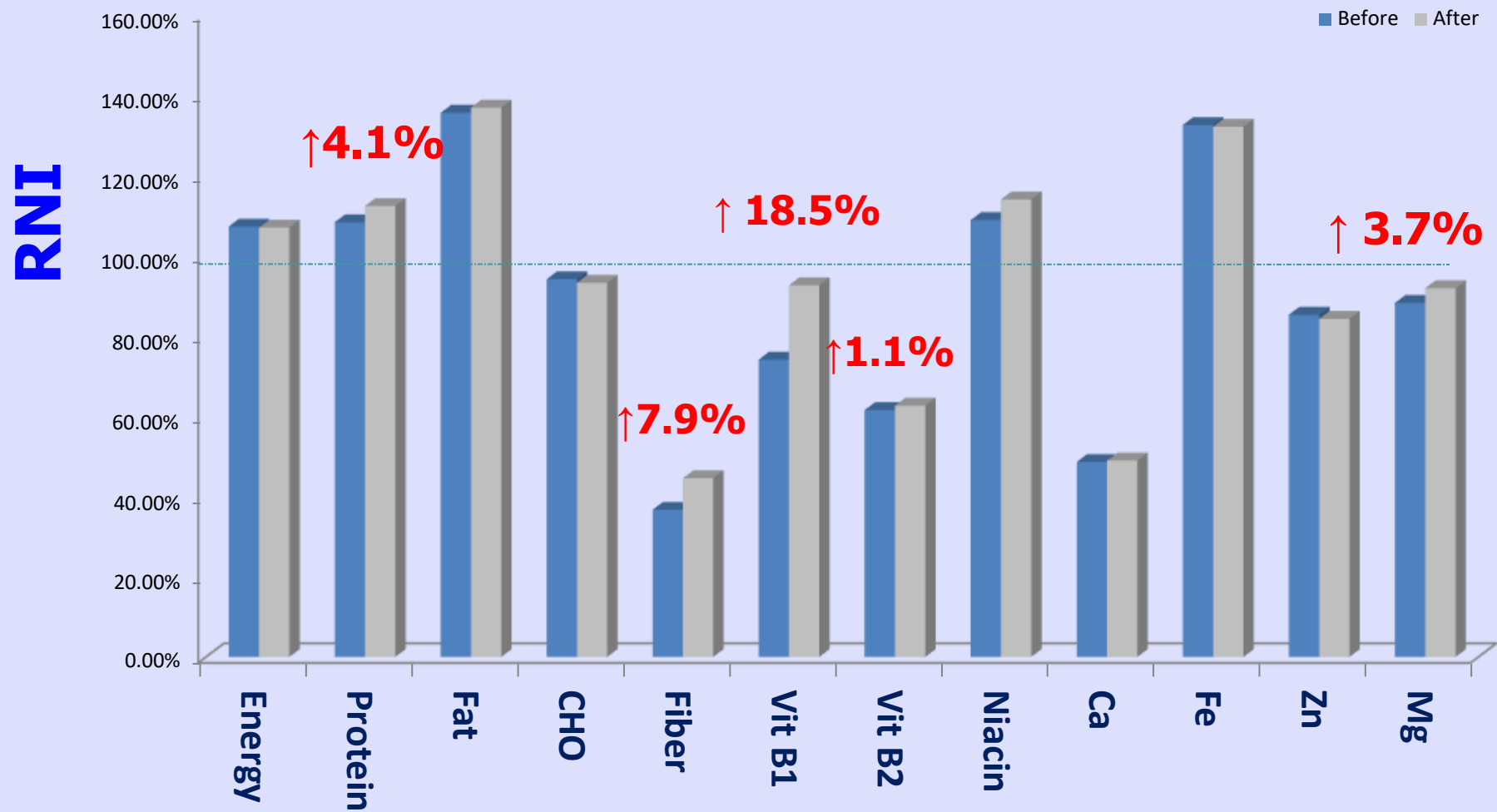
营养成分比较

	Wheat flour, white 富强粉	Standard grade 标准粉	Whole grain wheat flour 美国全麦粉
Energy 能量	361	354	340
Protein 蛋白质	12.3	15.7	13.21
Lipids 脂肪	1.5	2.5	2.5
CHO 碳水化合物	74.9	70.9	71.97
Dietary fiber 膳食纤维	0.4	3.7	10.7
Vitamin B1	0.11	0.46	0.502
Vitamin B2	0.03	0.05	0165
Folic acid 叶酸	10.3	23.3	44
Niacin 烟酸	0.94	1.91	4.957
Calcium 钙	27	31	34
Magnesium 镁	32	50	137
Iron 铁	0.7	0.6	3.6
Zinc 锌	0.39	0.2	2.6
Selenium 硒	6.79	7.42	61.8

营养成分比较

	White rice 精米	Brown rice 糙米 (USDA)
Energy 能量	337	362
Protein 蛋白质	6.4	7.5
Lipids 脂肪	1.2	2.68
CHO 碳水化合物	78.1	76.17
Dietary fiber 膳食纤维	2.8	3.4
Vitamin B1	0.06	0.413
VitamineB2	0.02	0.043
Folic acid 叶酸	11.5	20
Niacin 烟酸	0.67	4.308
Calcium 钙	3	33
Magnesium 镁	25	143
Iron 铁	0.2	1.8
Zinc 锌	1.76	2.02
Selenium 硒	4.17	15.1

50% 精面粉替换为标准粉



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