

# Alkyresorcinol (AR) Can Not Indicate Whole Grain Barley Intake

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# Outline

Study Design

Alkylresorcinols (AR) in Literature

AR in Barley Dataset

# Study Design

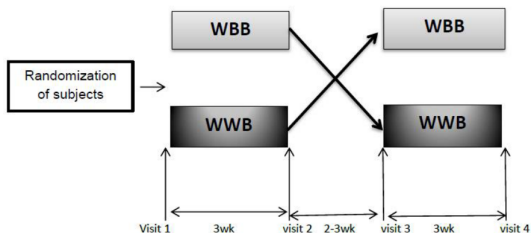


Figure 1: Schema of Study Design (WBB=whole barley bread; WWB=whole wheat bread)

- ▶ randomized cross-over intervention design
- ▶ 2 bread rolls/day during intervention period
- ▶ 14 healthy volunteers (6 men, 8 women)
- ▶ fasting plasma & 24-h pooled urine samples
- ▶ Conclusion: No significant changes of CVD risk factors and other health status factors (before & after intervention; after barley & wheat)

# Alkylresorcinols: biomarkers of whole grain cereal intake

## **Current status**

- ▶ Widely reported and validated biomarker for whole grain cereals (Table)
- ▶ Detected both in urine and plasma

## **Limitations**

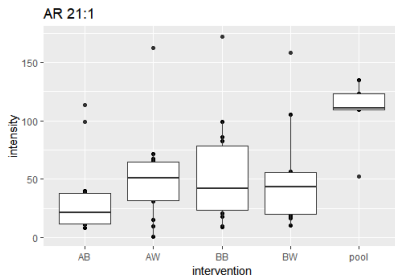
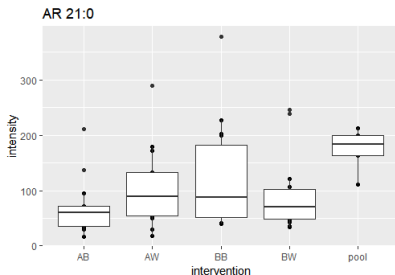
- ▶ Taking account of all whole grain cereals.
- ▶ Not specific to individual grain type (wheat, rye, oats, barley...)
- ▶ No barley biomarkers reported

# Alkylresorcinols (updated until Nov, 2018)

No	Authors	Experimental methods	Food types	Compounds	Subjects	Matrix	Reference
1	Wierzbicka, R etc.	three-day weighed food record	Whole grain cereals	alkylresorcinol metabolites	69 Swedish	urine	[15]
2	Zhu, YD etc.	Diet Intervention	Whole grain wheat	alkylresorcinol metabolites, benzoxazinoid derivatives, phenolic acid derivatives	12 healthy participants	urine	[16]
3	Garcia-Aloy, M etc.	Self-reported food frequency questionnaires	whole grain bread	phytochemicals (benzoxazinoids, alkylresorcinol metabolites)	155 subjects	urine	[17]
4	Magnusdottir, OK etc.	controlled diet	whole grain rye	alkylresorcinol C17:0/C21:0 ratio	93 metabolic syndrome patients in Nordic countries	plasma	[18]
5	Lappi, J etc.	Diet Intervention	whole grain and fibre riched rye bread	alkylrecorsinol		plasma	[19]
6	Ma, JT etc.	Self-reported food frequency questionnaires	whole grain cereals	alkylrecorsinol	407 elders	plasma	[20]
7	Ross, AB etc.	Diet Intervention	whole grain food (including wheat, oats, brown basmati rice, corn, rice, barley)	alkylrecorsinol	316 overweight and obese participants	plasma	[21]
8	Andersson, A etc.	Food records	whole grain wheat and rye	alkylrecorsinol	72 Swedish adults	nonfasting and fasting plasma	[22]
9	Landberg, R etc.	semi-quantitative food frequency questionnaires	rye bread	alkylrecorsinol	360 post-menopausal women	plasma	[23]
10	Montonen, J. etc.	Self-reported food frequency questionnaires	Whole grain food	alkylrecorsinol	100 healthy adults	plasma	[24]
11	Guyman, LA etc.	three-day food record and food frequency questionnaires	Whole grain food	3-(3,5-dihydroxyphenyl)-1-propanoic acid		urine	[25]
12	Landberg, R etc.	Diet Intervention	whole grain wheat and rye	alkylrecorsinol	22 women and 8 men	plasma	[26]

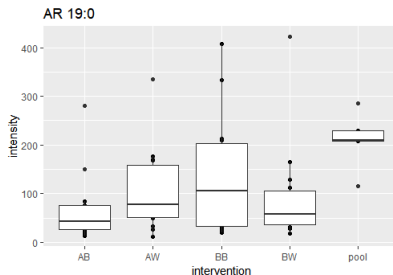
# AR in Barley Dataset: serum

	Formula	Reference RT	Reference MZ	Annotation	Detected RT	Detected MZ
AR(C21:0) glucuronide	C33H56O8	5.03	579.389	[M-H]-	5.0222	579.3902
AR(C21:1) glucuronide	C33H54O8	4.92	577.375	[M-H]-	4.9199	577.3736
AR(C19:0) glucuronide	C31H52O8	4.92	551.360	[M-H]-	4.9143	551.3579



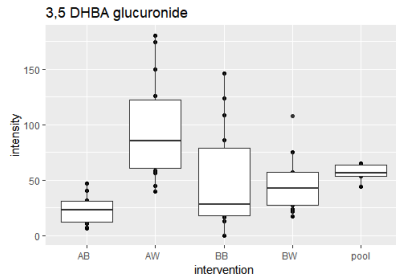
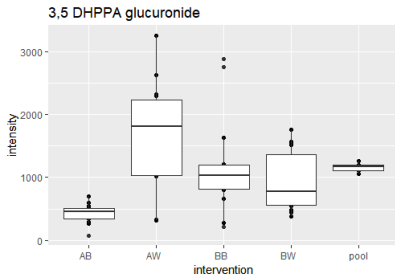
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# AR in Barley Dataset: urine

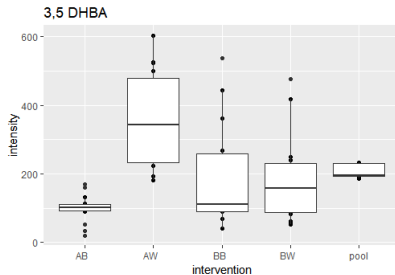
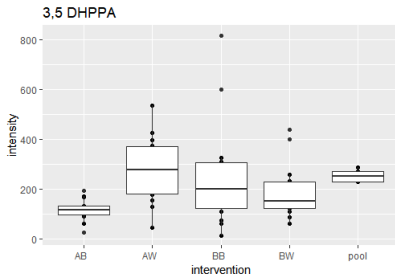
Molecular	Formula	Reference RT	Reference MZ
3,5 DHPPA glucuronide	C15H18O10	1.98	357.09
3,5 DHBA glucuronide	C33H14O10	0.93	329.051
3,5 DHPPA	C9H10O4	2.66	181.041
3,5DHBA	C7H6O4	1.94	153.018





# AR in Barley Dataset: urine

Molecular	Formula	Reference RT	Reference MZ
3,5 DHPPA glucuronide	C15H18O10	1.98	357.09
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3,5DHBA	C7H6O4	1.94	153.018



# Conclusion

- ▶ Subjects regularly consume whole grain cereals
- ▶ AR can not indicate whole grain barley intake