


Maastricht University *Leading in Learning!*

Gluten protein: the good, the bad or just ugly for some of us?



Fred Brouns

Faculty of Health, Medicine and Life Sciences
NUTRIM- School of Nutrition and Translational Research in Metabolism
The Netherlands

Maastricht University *Leading in Learning!*

Consumption of wheat-foods is the cause of obesity and chronic disease say Davis, Perlmutter, o.a.



WHEAT BELLY: LOSE THE WEIGHT, STOP THE PAIN, AND FIND YOUR WAY BACK TO HEALTH

GRAIN BRAIN: The Surprising Truth About Wheat, Carbs, and Sugar - Your Brain's Silent Killers

LOSE THE WHEAT, LOSE AND FIND YOUR FAT BACK

THE PALEO DIET: Lose Weight and Get Healthy by Eating the Food You Were Disallowed to Eat

CHEAPER THAN HEROINE

William Davis, MD

Loren Cordain, Ph.D.

Maastricht University *Leading in Learning!*

CBS THIS MORNING

What's Hot | Politics & Power | **HealthWatch** | Pop Culture | Lifestyle | Morning Money

September 3, 2012 9:28 AM

PRINT | TEXT

Modern wheat a "perfect, chronic poison," doctor says

Wheat eating Murray beats Gluten free Djokovic



RETAINS WORLD TITLE BEATING NOVAK DJOKOVIC AT ATP WORLD TOUR FINAL

Maastricht University *Leading in Learning!*

Building a case that wheat is bad for all of us..

frontiers in Human Neuroscience

REVIEW published: 29 March 2016 doi: 10.3389/fnhum.2016.00130



Bread and Other Edible Agents of Mental Disease

*Paola Bressan * and Peter Kramer*
Department of General Psychology, University of Padua, Padova, Italy

Bressan and Kramer REVIEW : 29 March 2016 doi: 10.3389/fnhum.2016.00130

Maastricht University *Leading in Learning!*

“Bread and Other Edible Agents of Mental Disease”

- “We have shown that in all of us bread makes the gut wall more permeable, encouraging the migration of toxins and undigested food particles to sites where they can alert the immune system”.
- Where are the data proving gut disordered permeability in all people?
- “We have shown that in all of us the digestion of grain and dairy generates opioid-like compounds, and that these cause mental derangement if they make it to the brain”.
- Where are the data proving circulation in blood and uptake into the brain?

Bressan and Kramer REVIEW : 29 March 2016 doi: 10.3389/fnhum.2016.00130

Maastricht University *Leading in Learning!*

“Bread and Other Edible Agents of Mental Disease”

- “The evidence is overpowering that hypersensitivity can bring with mental disturbances like schizophrenia, bipolar disorder, depression, anxiety, and autism...”
- Being related is no CAUSALITY
- “Sugar, provokes the release of endorphins and can induce impressive craving, binging and withdrawal problems...”
- Anything that gives a good feeling induces brain reward activity, also seeing you beloved again, getting flowers, scoring a goal.....
- Sugar addiction does not exist (Markus et al. Appetite 2017 in press)

Bressan and Kramer REVIEW : 29 March 2016 doi: 10.3389/fnhum.2016.00130

Maastricht University *Leading in Learning!*

Building a case that wheat is bad for all of us..

- “The genome responsible for the best quality bread is associated with the most toxic proteins” (Kucek et al., 2015).
- What is “most toxic”? Quantity?
- “Unfortunately, gluten has proven to be toxic for a proportion of people that in the last few decades has been constantly rising”
- “how much rise? Rise due to better national registration? Fact: CD is still around 1%
- “Indeed, the wheat varieties that contain the most detrimental type of gluten have become more common” (van den Broeck et al., 2010).
- What is “most detrimental”? ... all are immune reactive...

Bressan and Kramer REVIEW : 29 March 2016 doi: 10.3389/fnhum.2016.00130

Social media:
“Eating wheat makes you fat and sick!”

Strong assumption are being put forward

We have only been eating grains for 10.000 years, too short to adapt to it, without getting ill...

Modern wheat has been genetically modified leading to gluten, lectins, glutenmorphins than in “ancient” grains...

FODMaPs are the cause of many complaints

“Ancient” grains are healthier. Go back...!

What are the facts?


Maastricht University *Leading in Learning!*

We eat cereals only since 10.000 years and we are (genetically) not adapted to that? Is this correct?



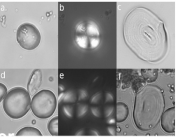
Maastricht University *Leading in Learning!*

Large scale processing of wild cereal grains at ohalo II, a 23 000-year old campsite Israel



Nadel et al. Antiquity, Vol. 86, 334, Dec. 2012, Pages 990-1003

45.000 years ago: Micro-particles in dental enamel prove consumption of plants and cooked meals in the Neanderthal diet: **dates, vegetables, roots, wheat, rye and barley**




Nadel et al. Antiquity, Vol. 86, 334, Dec. 2012, Pages 990-1003, PNAS | January 11, 2011 | vol. 108 | no. 2 | 487

Maastricht University *Leading in Learning!*

Microfossils in calculus demonstrate consumption of plants and cooked foods in Neanderthal diets (Shanidar III, Iraq; Spy I and II, Belgium)

Amanda G. Henry^{a,b,1}, Alison S. Brooks^a, and Dolores R. Piperno^{b,c,1}



Maastricht University *Leading in Learning!*

- 1-4 million years: our ancestors in Kenia consumed primarily **plants, grasses and seeds based diet**



www.pnas.org/cgi/doi/10.1073/pnas.1222571110

Maastricht University *Leading in Learning!*

Fossil grain- 300 milion yrs found: Geo park Araripe- Brasil



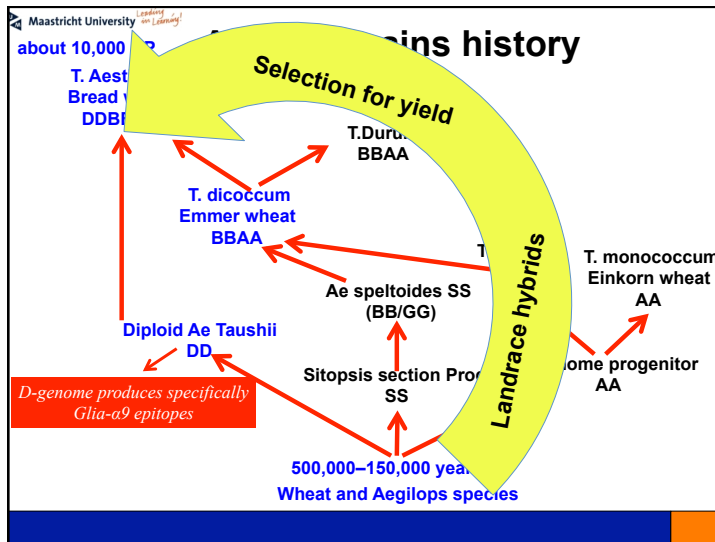
Maastricht University *Leading in Learning!*

**Absence of evidence
is
no evidence of absence!**

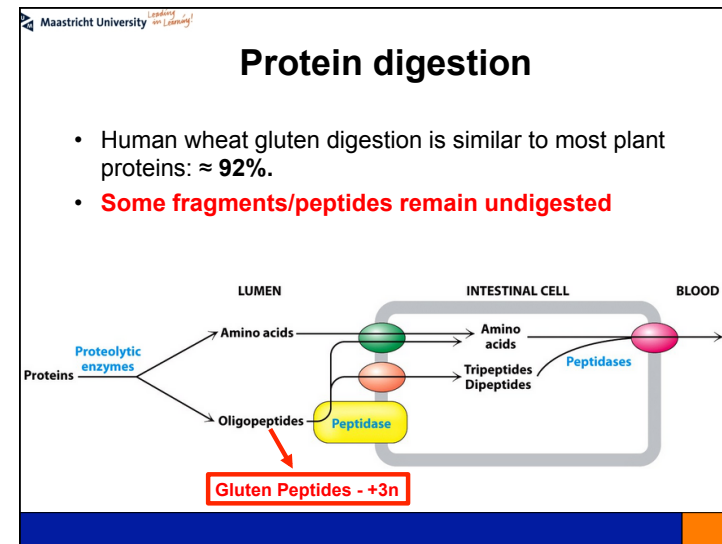
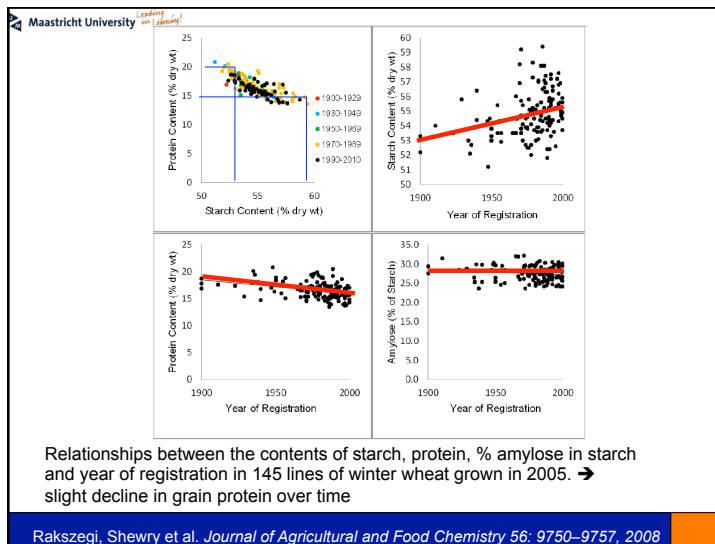
Maastricht University *Leading in Learning!*

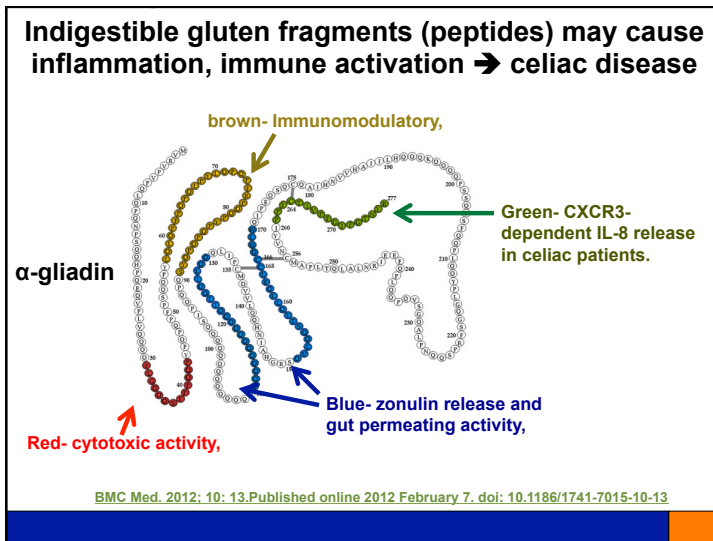
**Davis and social media sources:
Modern Wheat contains more gluten and
other sick making components than
“ancient wheats”**

Is this Correct ?



- Maastricht University *Leading in Learning!*
- ### Wheats and genomics
- Diploid: AA
 - Einkorn (T-monococcum)
 - Tetraploid: AABB
 - Emmer (T. turgidum L. ssp. dicoccum)
 - Durum (T. turgidum L. ssp. Durum)
 - Rivet (T. turgidum L. ssp. Turgidum)
 - Khorasan wheat (Triticum turgidum L. ssp. Turanicum)
 - Hexaploid: AABBDD
 - Modern wheat = breadwheat (Triticum aestivum spp. aestivum)
 - Spelt (T. aestivum ssp. Spelta)





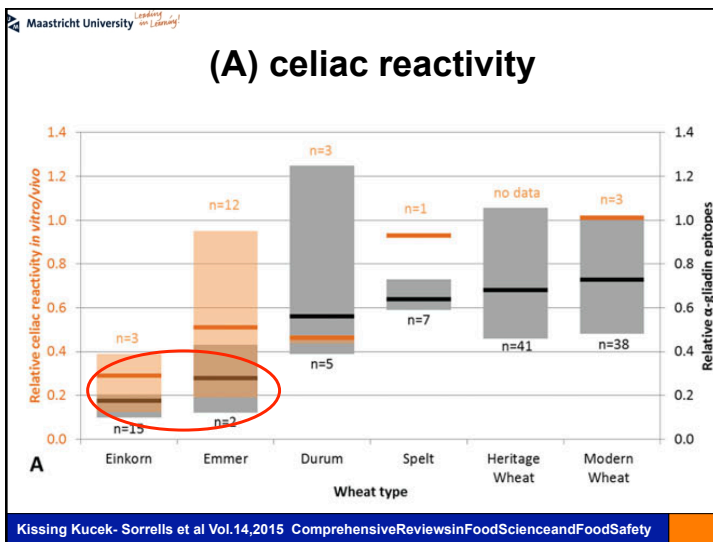
Maastricht University *Leading in Learning!*

Comprehensive REVIEWS
in Food Science and Food Safety

A Grounded Guide to Gluten: How Modern Genotypes and Processing Impact Wheat Sensitivity

Lisa Kissing Kucek, Lynn D. Veenstra, Plaimin Amnuaycheewa, and Mark E. Sorrells

Kissing Kucek, et al Vol.14,2015 ComprehensiveReviewsinFoodScienceandFoodSafety



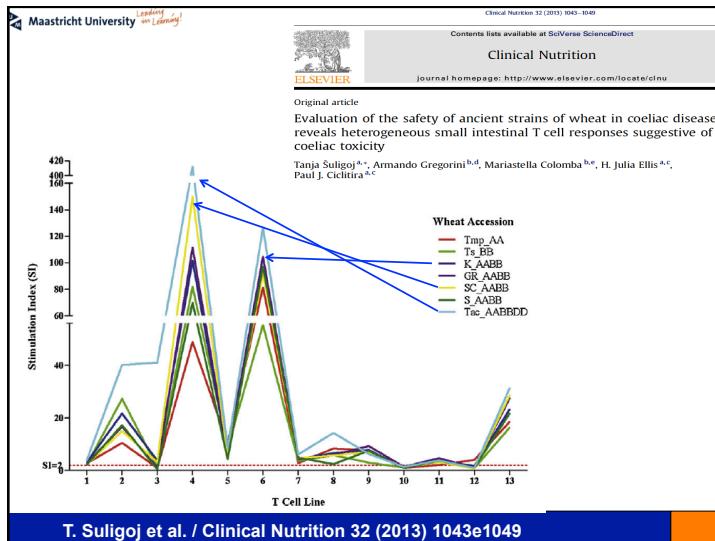
Maastricht University *Leading in Learning!*

Immunogenicity Characterization of Two Ancient Wheat α-Gliadin Peptides Related to Coeliac Disease

Armando Gregorini ^{1,*}, Mariastella Colomba ², H. Julia Ellis ³ and Paul J. Ciclitira ³

Old durum varieties contain more gluten epitopes and express more immune reactivity than recent types

Nutrients 2009, 1, 276-290; doi:10.3390/nu1020276



Take home messages:

- Wheat, Rye, Barley and oats have been grown as a local staple food > 45.000 years ago.
- The spontaneous hybrid -**hexaploid bread wheat**- appeared ≈11.000 years ago and developed rapidly due to great yields
- There is NO GM-wheat on the global market!
- Gluten is digested for ≈ 92%. Some peptide fragments remain undigested and may cause illness.

Take home messages:

- Ancient wheats differ little from modern wheat species in the contents of most bioactive components.
- **The only notable difference** from bread wheat is higher content of the carotenoid lutein in einkorn, emmer and Khorasan. (Carotenoids have **been selected against** in bread wheat due to their colour)
- Durum wheat has a high lutein due **to selection for yellow colour**.
- Extensive analyses does not support suggestions that ancient wheats are more “healthy” than modern wheats.

P.R. 240 Shewry, S. Hey / Journal of Cereal Science 65 (2015) 236e243

Take home messages:

- Overall, modern wheat lines have higher contents of toxic epitopes


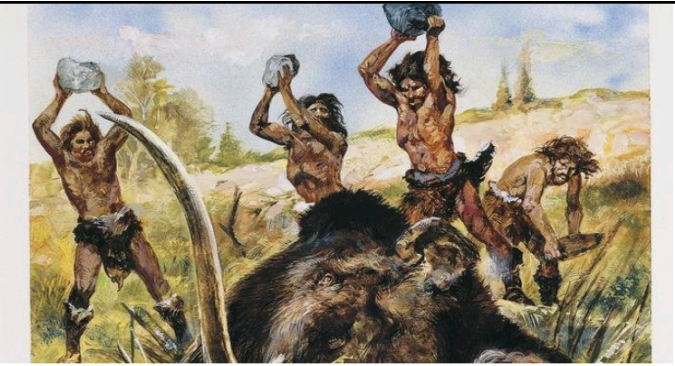
However:

- Some ancient types have higher contents than modern types (Van den Broeck 2010)
- All wheats show immuno-reactivity in susceptible persons
- None of the ancient or moderns wheats is safe for celiac patients
- None of the processed foods that aims at reducing gluten and epitopes content is “FREE FROM”

Maastricht University *Leading in Learning!*



Eating as our ancestors... can we still?

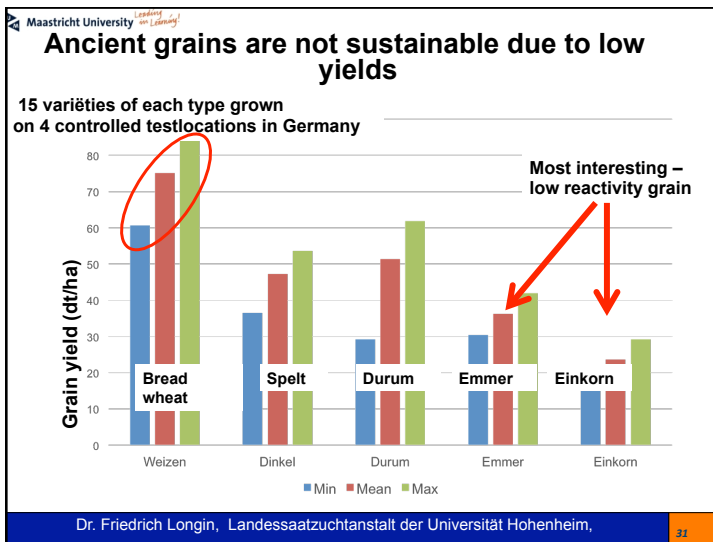
- The “paleo diet” excludes consumption of domesticated foods such as cereals (wheat, barley, rye, oat, corn, rice), dairy products and starchy staple foods (potato, tapioca, ect) since these were not available.
- TODAY, however, these are the most important contributors to human energy intake

Paleo Meat Meets Modern Reality

Published on March 16, 2016 | Featured in: [Healthcare](#)

 David L. Katz, MD, MPH, FACPM, FACP, FACLM  fluencer
 Founder, True Health Initiative



Maastricht University *Leading in Learning!*

Ancient grains

Will always remain Niche products and cannot “feed the world”

32

Maastricht University *Leading in Learning!*

A 50 days wheat gluten ONLY diet did NOT raise BW

- **Control phase**, 20 days subjects received a normal-type diet → 12.2g N/day, 45% from animal sources: milk, eggs, and meat
- **Experimental phase: 50 days** → 11.8g N/day, of which, **90-95% was derived from commercial wheat** bread / rolls ("Gold Medal Kitchen-Tested Enriched" (13% protein) from General Mills, MN).

Body weight, KG

Measurement periods, block of 5 days

BOLOURCHI, et al AJCN Vol. 21, No. 8, August, 1968, pp. 827-835

Maastricht University *Leading in Learning!*

Wheat protein rivals whey for muscle growth, study suggests

By Will Chu 05-Sep-2016
Last updated on 05-Sep-2016 at 16:20 GMT 1 comment

The findings identify wheat protein as a viable protein source for muscle maintenance in the elderly. ©Stock/triocean

Gluten is a good source of Leucine

Corissen, Loon et al J. Nutr. 2016 146: 9 1651-1659; first online July 20, 2016.

Maastricht University *Leading in Learning!*

Autism spectrum disorders and the gut-brain axis

No evidence for gluten as a causal/contributing factor in autism!

Sande, Buul, Brouns "Autism and nutrition: the role of the gut-brain axis"
Nutrition Research Reviews, page 1 of 16, 2014

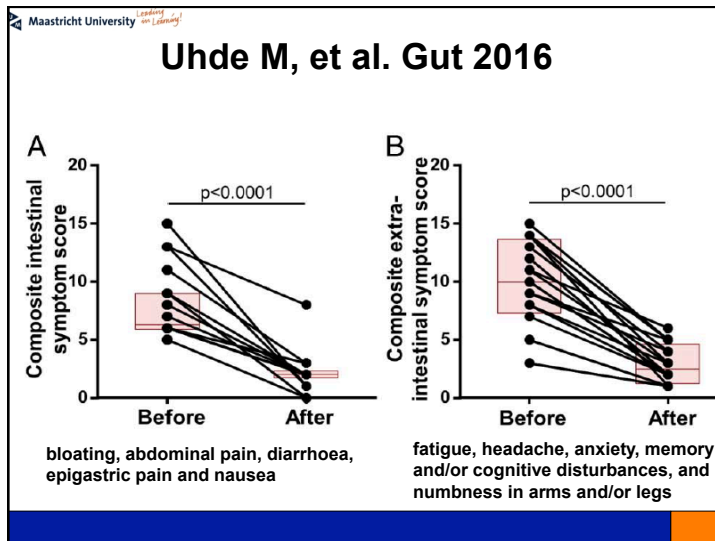
Maastricht University *Leading in Learning!*

Effect of gluten free diet on immune response to gliadin in NCGS patients

AGLiG Time (AU)

Before GFD After GFD

Caio et al. BMC Gastroenterology 2014, 14:26



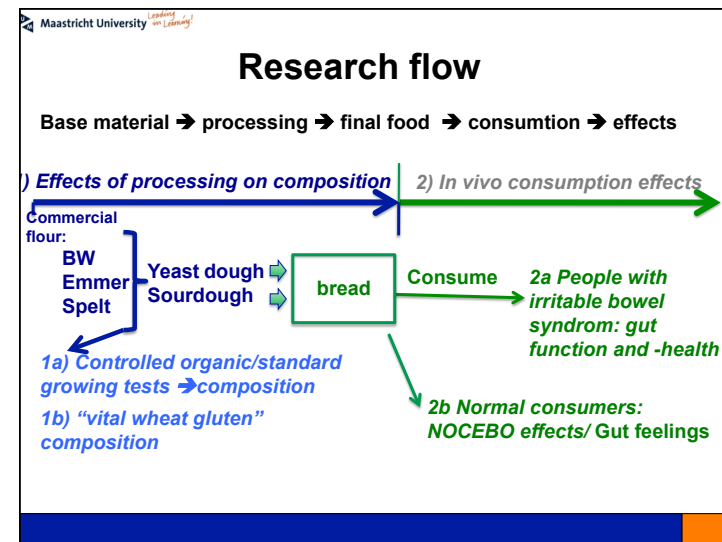
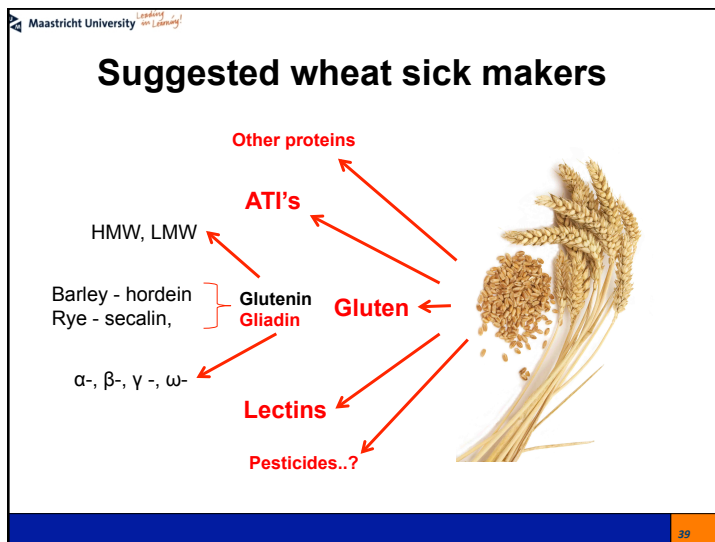
Maastricht University *Leading in Learning!*

Well on Wheat? 'WoW'

"An international project addressing the effects of wheat composition, processing and consumption on gastrointestinal function and symptoms in humans"

Project steering group:

- Lead Fred Brouns UM, NL
- Peter Shewry, Rothamsted, UK
- Twan America, WUR, NL
- Flip van Straaten, NBC, NL
- Michaela Pichler, ICC, AU



Step 1: What is the composition of selected cereals and what changes occur as result of food processing?

cereal types:

- Bread wheat -hexaploid (BW) → flour
- Emmer -tetraploid (Em) → flour
- Spelt -hexaploid (Sp) → flour

Analyze composition

dough processing methods:

- Short ferment.- yeast (BW, Em, Sp) → 3 doughs/ breads
- Long ferment.- active starter → 3 doughs/breads

Analyze composition

Analysis:

- Fiber, LMW CHO's, fructans (Fodmaps);
- Gluten (gliadins, glutenins, toxic epitopes, glutenmorphins, ATI's, lectins,
- Phytate, zinc, iron, magnesium, phenolics,
- Optional: immune- T cell stimulation, pesticide residues

Step 2: consumption effects of 3 wheat bread types in individuals with sensitive bowels (IBS)

time

Group 1: Bread Wheat n=30

Group 2: Emmer N=30

Group 3: Spelt N=30

Run in 1 week

Free from (ff) diet 2 weeks*

Challenge YF/SF BW 2 weeks*

ff diet wash out 2 weeks*

Challenge SF/YF BW 2 weeks*

Run in 1 week

Free from (ff) diet 2 weeks

Challenge YF/SF Em 2 weeks

ff diet wash out 2 weeks

Challenge SF/YF Em 2 weeks

Run in 1 week

Free from (ff) diet 2 weeks

Challenge YF/SF Sp 2 weeks

ff diet wash out 2 weeks

Challenge SF/YF Sp 2 weeks

Between groups comparison

Within group comparison

YF= Yeast fermentation
SF= sourdough fermentation

↑ = sampling of biomaterials for analysis

Step 1a) –Framework!

Wheat/gluten avoidance (WGA): role of NOCEBO effects study in at least 2- regions (Nordic Countries, central Europe, ...)

- Hypothesis: perceived food type (as influenced by social media and labelling) rather than actual bread composition affects subjective perceptions after consumption in healthy WGA individuals

Run in week

TEST week

Run out week

= moments of questionnaire
Test for GI-symptoms, overall perception

Healthy grain supply for global Nourishment: food intolerance is a global issue

Need for healthy grains

Breed for healthy foods

Seeds Farmers Harvest

Storage Transport

Millers Storage

Transport to food producer

BREAD BF-CEREAL PASTA



Take home messages:

- Grains, incl. gluten are well tolerated by most of us and whole grain consumption is associated with health benefits
- YET. intolerance exists in non-celiac, non-allergic individuals
→ few % of population
- Is it gluten, ATI's, FODMAPs, other components???
- Is it a side effect of IBS?
- Is it mental/psychological?

- Reason for controlled studies