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# GLUTEN AND YOUR DIET

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# WHAT IS GLUTEN?



## Dietary Factors

### The Grass Family - (GRAMINEAE)

Subfamily

Festucoideae

Tribe



Zizaneae

Oryzaeae

Hordeae

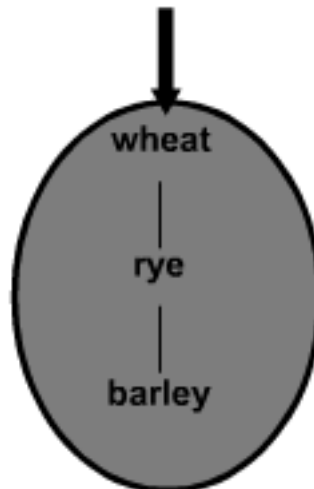
Aveneae

Festuceaea

Chlorideae

↓  
wild rice

↓  
rice



↓  
oat

↓  
finger millet  
(ragi)

↓  
teff

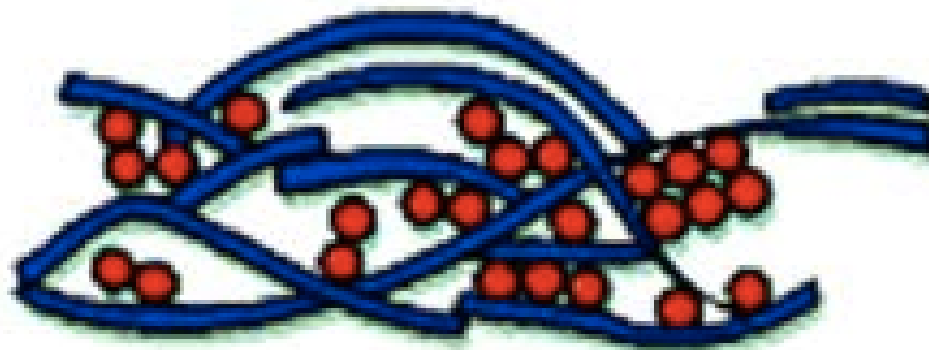
# WHAT IS GLUTEN?



**GLIADIN**



**GLUTENIN**



**GLUTEN (GLIADIN + GLUTENIN)**

# WHAT IS GLUTEN?

- ⦿ GIVES GRAINS THEIR ELASTICITY
- ⦿ OUR GRAINS HAVE BEEN ENGINEERED TO CONTAIN MORE GLUTEN

# WHAT IS GLUTEN

- ⦿ A PROTEIN THAT WE CANNOT DIGEST COMPLETELY
- ⦿ OUR BODIES CAN MOUNT AN IMMUNE RESPONSE TO THE UNDIGESTED PORTION OF GLUTEN

# WHAT IS GLUTEN?- A KEY MOLECULAR MECHANISM RELATED TO ZONULIN

## ◎ ZONULIN

- UP-REGULATED BY GLUTEN
- LEADS TO INCREASED PERMEABILITY OF THE INTESTINAL EPITHELIAL CELLS LEADING TO A LEAKAGE OF GLUTEN AND OTHER ANTIGENS GIVING THEM ACCESS TO OTHER PARTS OF THE BODY WHICH MAY CONTRIBUTE TO AUTOIMMUNE DISEASES

## ◎ FOCUS OF MUCH RESEARCH FOR FUTURE MEDICATIONS

# GRAINS AND OUR DIET

- I LOVE BREAD!

# DISEASES ASSOCIATED WITH GLUTEN

- ⦿ CELIAC DISEASE
- ⦿ GLUTEN INTOLERANCE
- ⦿ WHEAT ALLERGY

# HOW MANY PEOPLE DO GLUTEN-RELATED DISEASES AFFECT?

- ⦿ 3 MILLION AMERICANS HAVE CELIAC DISEASE
- ⦿ UP TO 20 MILLION AMERICANS MAY HAVE GLUTEN SENSITIVITY
- ⦿ 400,000 TO 600,000 HAVE WHEAT ALLERGY

# HISTORY OF CELIAC DISEASE

- ◉ PREHISTORIC MAN INITIALLY EXISTED BY EATING MEATS, NUTS AND FRUIT
- ◉ NEOLITHIC PERIOD: AN AGRICULTURAL REVOLUTION
- ◉ 1ST CENTURY AD: GREEK PHYSICIAN NAMED ARETAEUS OF CAPPADOCIA WROTE
  - “IF THE STOMACH BE IRRETENTIVE OF THE FOOD AND IF IT PASS THROUGH UNDIGESTED AND CRUDE, AND NOTHING ASCENDS INTO THE BODY, WE CALL SUCH PERSONS *COELIACS*”

# CELIAC DISEASE

## ◎ HISTORY CONTINUED:

- 19TH CENTURY: DR. MATHEW BAILLIE
  - DESCRIBED A CHRONIC DIARRHEAL DISORDER OF ADULTS CAUSING MALNUTRITION AND CHARACTERIZED BY A GAS-DISTENDED ABDOMEN
    - HE SUGGESTED TREATING WITH A DIET CONSISTING ALMOST ENTIRELY OF **RICE**.
- 1887: DR. SAMUEL GEE
  - GAVE A LECTURE TO MEDICAL STUDENTS ON THE “CELIAC AFFECTION.” HE NOTED THAT DIETARY MODIFICATION WAS THE CURE

# CELIAC DISEASE

## ◎ HISTORY CONTINUED

- 1924: SIDNEY HAAS:
  - SUCCESSFULLY TREATED 8 CELIAC CHILDREN WITH THE “BANANA DIET”
    - EXCLUDED BREAD, CRACKERS, POTATOES AND ALL CEREALS
- 1940S: DR. DICKE A DUTCH PEDIATRICIAN
  - BREAD SHORTAGES LEAD TO IMPROVEMENT IN CELIAC PATIENTS
  - ALLIED PLANES DROPPING BREAD LEAD TO WORSENING SYMPTOMS
- 1960S:
  - INTESTINAL BIOPSIES REVEALED THE DAMAGE

# CELIAC DISEASE

## ◎ HISTORY CONTINUED:

- 1960S AND 1970S: ANTIBODIES WERE IDENTIFIED
  - ANTI-GLIADIN AND ANTI-RETICULIN
- 1980S:
  - DISCOVERED AN ASSOCIATION BETWEEN CD AND **TYPE 1 DIABETES AND DOWN SYNDROME**
- 1990S:
  - GENETIC LINK PROVEN AND **TISSUE TRANSGLUTAMINASE** (THE AUTOANTIGEN THE BODY RECOGNIZES AS ABNORMAL IN CD) WAS DISCOVERED
- RESEARCH CONTINUES

# CELIAC DISEASE

- ◉ **AUTOIMMUNE** DISEASE
- ◉ INCREASED INTESTINAL PERMEABILITY (ZONULIN)
- ◉ CAN DEVELOP SYMPTOMS AT **ANY AGE**
- ◉ WE KNOW THE TRIGGER (GLUTEN) AND THE AUTO-ANTIGEN (TISSUE TRANSGLUTAMINASE)
- ◉ ELIMINATE GLUTEN AND THE DISEASE RESOLVES (TISSUE TRANSGLUTAMINASE LEVELS DROP)

# HOW DOES ONE GET CELIAC DISEASE

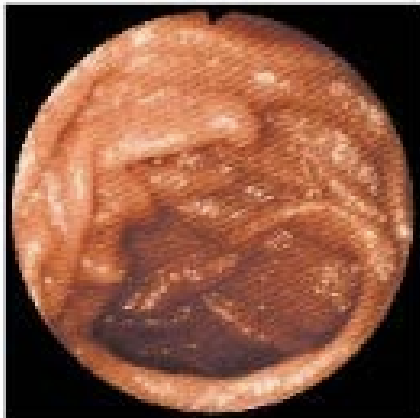
- ◎ RIGHT GENES + RIGHT  
ENVIRONMENT + GLUTEN

# SIGNS AND SYMPTOMS OF CELIAC DISEASE?

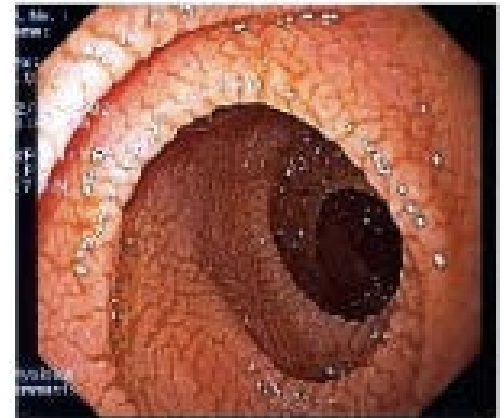
- ⦿ DIARRHEA WITH BULKY, FOUL-SMELLING, FLOATING STOOLS AND FLATULENCE
- ⦿ FATIGUE, ANEMIA, ABDOMINAL PAIN, MOODINESS, WEIGHT LOSS, LACTOSE INTOLERANCE
- ⦿ SYMPTOMS RESOLVE ON THE DIET
  - AND YOU MAY NOTICE SYMPTOMS THAT YOU HADN'T NOTICED BEFORE

# WHAT HAPPENS TO PEOPLE WHO HAVE CELIAC DISEASE?

Normal small bowel



Celiac disease



Gluten



Gluten-free diet

# DISEASES ASSOCIATED WITH CELIAC DISEASE

- ◉ TYPE 1 DIABETES
- ◉ DOWN SYNDROME
- ◉ LIVER DISEASES
- ◉ THYROID DISEASE
- ◉ HEART DISEASES (AUTOIMMUNE MYOCARDITIS OR IDIOPATHIC DILATED CARDIOMYOPATHY)
- ◉ TONGUE SORENESS, IRRITATION (AKA ATROPHIC GLOSSITIS)
- ◉ APTHOUR ULCERS (CANKER SORES)
- ◉ PANCREATITIS (MAY BE ASSOCIATED)
- ◉ MENSTRUAL AND REPRODUCTIVE ISSUES
- ◉ IRON DEFICIENCY ANEMIA
- ◉ OSTEOPOROSIS
- ◉ KIDNEY DISEASE (IGA NEPHROPATHY)
- ◉ NEUROLOGIC DISEASES: PERIPHERAL NEUROPATHY, LOSS OF BALANCE, DEPRESSION, ANXIETY, OR SEIZURE DISORDERS
- ◉ INTESTINAL LYMPHOMA
- ◉ SJOGREN'S SYNDROME
- ◉ LUPUS
- ◉ SKIN DISEASE: **DERMATITIS HERPETIFORMIS**

# DERMATITIS HERPETIFORMIS

# COULD YOU HAVE CELIAC DISEASE

- 1 % OF THE POPULATION

# COULD YOU HAVE ANOTHER DISEASE ASSOCIATED WITH GLUTEN?

- ◎ 3 KNOWN
  - CELIAC DISEASE
  - GLUTEN INTOLERANCE
  - WHEAT ALLERGY

WHAT IF I HAVE THE SYMPTOMS  
BUT MY CELIAC TESTS ARE  
NEGATIVE?

◎ CONSIDER *GLUTEN INTOLERANCE*

# GLUTEN INTOLERANCE

- ◎ A NEW PHENOMENON

- PROBABLY DIAGNOSED BY *PATIENTS* MORE OFTEN THAN DOCTORS

# GLUTEN INTOLERANCE

- ◉ LOOKS A LOT LIKE CELIAC DISEASE
- ◉ NO BLOOD TESTS TO DIAGNOSE THE CONDITION
  - *BUT! ANTI-GLIADIN ANTIBODY IS POSITIVE 50% OF PATIENTS WHO CLAIM GLUTEN INTOLERANCE*
- ◉ NOT AN AUTOIMMUNE DISEASE
- ◉ NO EVIDENCE OF INCREASED GUT PERMEABILITY
- ◉ SEEMS THAT SOME PEOPLE WITH GLUTEN INTOLERANCE CAN TOLERATE SOME GLUTEN

# GLUTEN INTOLERANCE

- ◉ WHEREAS CELIAC DISEASE AFFECTS 1% OF OUR POPULATION, GLUTEN INTOLERANCE AFFECTS BETWEEN **10-40%** OF THE PEOPLE IN THE US AND AROUND THE WORLD

# GLUTEN INTOLERANCE

- ◉ DEPRESSION, ADHD AND SCHIZOPHRENIA
  - OFTEN IMPROVE ON A GLUTEN-FREE DIET
  - IN ONE STUDY 80% OF KIDS WITH ADHD HAD ANTI-GLIADIN ANTIBODIES

# HOW ARE CD AND GLUTEN INTOLERANCE *DIFFERENT?*

- ⦿ EACH BASED ON A DIFFERENT IMMUNE SYSTEM MECHANISM
- ⦿ **KNOWN SEVERE CONSEQUENCES OF UNTREATED CD**

# SHOULD YOU BE TESTED OR TRY A GLUTEN-FREE DIET?

- ⦿ TALK WITH YOUR DOCTOR
- ⦿ DO NOT “GO GLUTEN-FREE” BEFORE BEING TESTED FOR CELIAC DISEASE

# WHO DO *I TEST* FOR CD OR SUGGEST A TRIAL OF A GF DIET?

- ⦿ IBS (IRRITABLE BOWEL SYNDROME)
  - CHRONIC UNEXPLAINED CONSTIPATION, DIARRHEA OR ABDOMINAL PAIN
- ⦿ SEVERE ACID REFLUX
- ⦿ CHRONIC MIGRAINE HEADACHES
- ⦿ CHRONIC SKIN RASHES
- ⦿ ACHINESS/ FIBROMYALGIA
- ⦿ CHRONIC FATIGUE
- ⦿ UNEXPLAINED NUMBNESS/ TINGLING
- ⦿ CLINICAL SUSPICION OR “WE’VE TRIED EVERYTHING ELSE AND YOU STILL DON’T FEEL BETTER”

# HOW DOES ONE “GO GLUTEN-FREE?”

- ⦿ READ UP
- ⦿ MEET WITH A DIETICIAN
- ⦿ BUY GLUTEN-FREE AND ASK FOR GF MENUS, CHECK MEDICATIONS
- ⦿ START READING LABELS
- ⦿ CELIAC DISEASE = PERMANENT DIET CHANGE
- ⦿ FOR PEOPLE WITH GLUTEN INTOLERANCE
  - START WITH A TRIAL OF A GLUTEN-FREE DIET FOR 2 WEEKS

# HOW DOES ONE “GO GLUTEN-FREE?”

- ◉ READ LABELS FOR SECRET CODE WORDS
  - ◉ MALT, MALT FLAVORING
  - ◉ HYDROLYZED VEGETABLE PROTEIN
  - ◉ VEGETABLE PROTEIN
  - ◉ MODIFIED FOOD STARCH

IT IS A GOOD TIME TO BE  
GLUTEN FREE

**Certified**



**TM**

**Gluten-Free**

QUESTIONS?

**THE END**