

# Brain and Bowel: What is the connection in celiac disease?

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CCA, Annual Conference, Moncton  
*May 26, 2007*



# Celiac disease

## Classical Definition

Disease of the small intestine characterized by an abnormal mucosa and associated with permanent intolerance to gluten in genetically susceptible individuals.

Removal of gluten leads to clinical remission and restoration of small intestinal mucosa to normal.

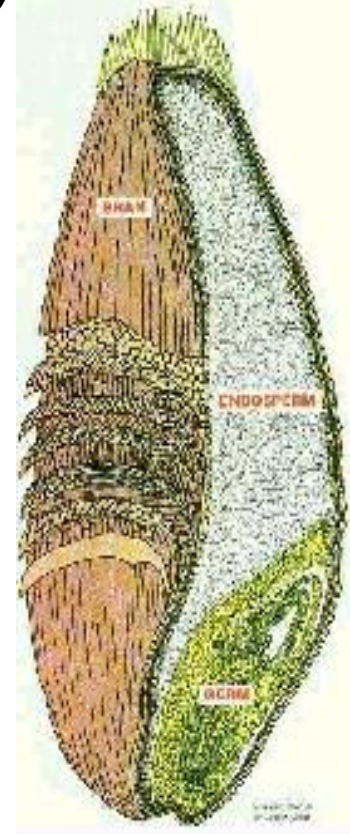
# Celiac disease: *Pathophysiology*

A true auto-immune disorder:

- Genetic predisposition (*HLA DQ2/DQ8*)
- Autoantigen (*tissue transglutaminase*)
- Exogenous trigger (*gluten*)

## Wheat Kernel

- Bran = fibre
- Endosperm = starch & protein
- Germ = protein and lipid
- Proteins (gluten)
  - gliadins
  - glutenins



# **Neurological complications in celiac disease**

Present in **6-10%** of cases

# Canadian Celiac Health Survey:

*Adult data (n=2,681)*

Mood swings/Depression **44%**

Migraine **24%**

Cranney A et al. *Dig Dis Sci* Apr 2007

# Canadian Celiac Health Survey:

*Pediatric data (n=168)*

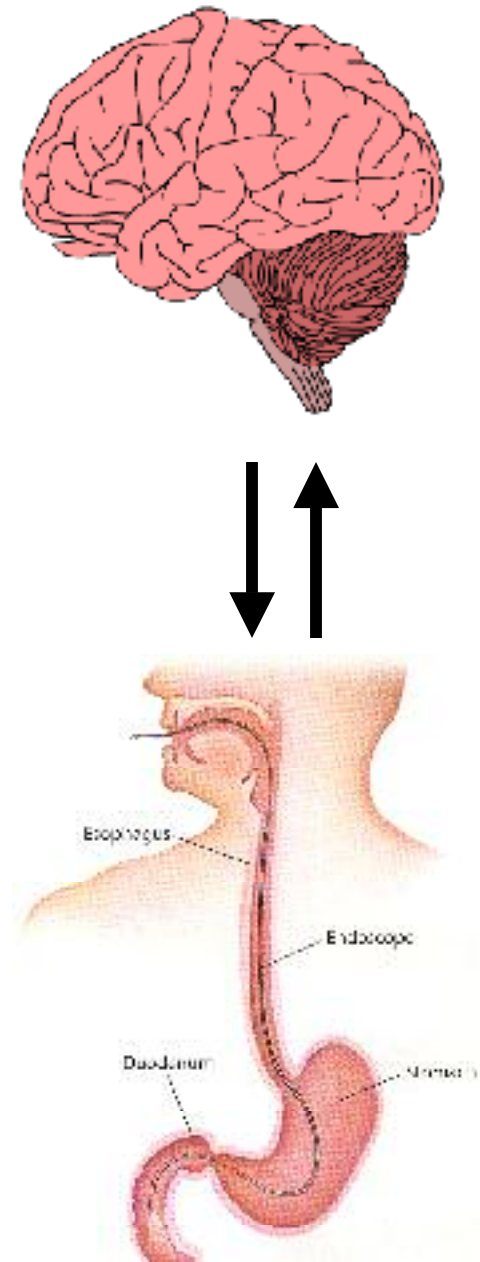
Mood swings/Depression **37%**

Rashid M et al. *Pediatrics* Dec 2005

# Celiac disease and neurological problems

*Possible mechanisms:*

- **Nutritional deficiencies**
- **Autoimmunity**
- **Direct gluten toxicity**



# **Celiac disease:** *Neurological problems*



**Epilepsy ( $\pm$ cerebral calcification)**

# **Celiac disease:** *Neurological problems*



**Headaches/Migraine**

# **Celiac disease:** *Neurological problems*



## **Neuropathy**

# **Celiac disease:** *Neurological problems*



**Depression**

# **Celiac disease:** *Neurological problems*



**Cerebellar ataxia**

# **Celiac disease:** *Neurological problems*



**Hypotonia**

# **Celiac disease:** *Neurological problems*



**Stroke**

# **Celiac disease:** *Neurological problems*



**Hyperactivity (ADHD)**

# **Celiac disease:** *Neurological problems*



**Autism**

No connection found

# **Celiac disease:** *Neurological problems*



*Other:*

- **Dementia**
- **Schizophrenia**

## **Celiac disease:** *Neurological problems*

*Response to gluten-free diet:*

- **Variable**
- **Some evidence of improvement**