

Immunological Aspects of Autism: Studies in Puerto Rico

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Immunological Alterations in Autism

General: increased incidence of allergies

Specific: low levels of immunoglobulin A

Studies to be Presented:

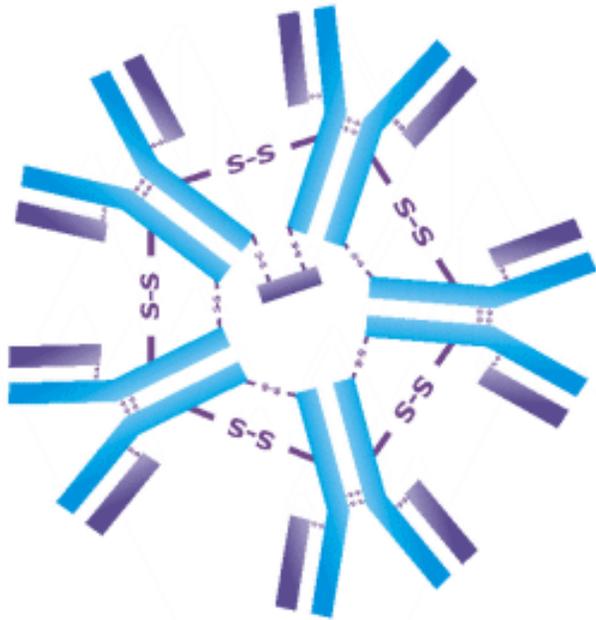
- Prevalence of autism spectrum disorders in relatives of patients with selective IgA deficiency
 - Allergic manifestations in children with autism spectrum disorders
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Definitions

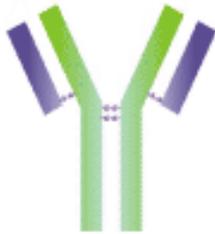
- **Immunoglobulin A (IgA)**
 - is one of the 5 classes of antibodies
 - mainly involved in mucosal defense

 - **Allergy**
 - a reaction caused by an antigen and an antibody after previous exposure of the immune system to the given antigen
 - the involved antibody is IgE
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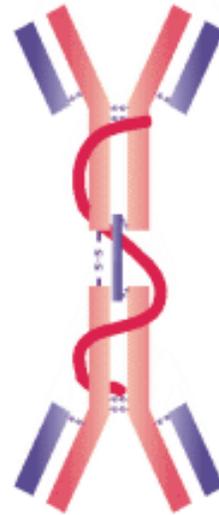
Classes of Antibodies



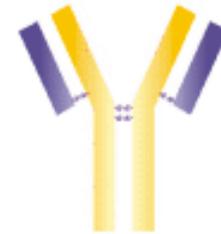
IgM



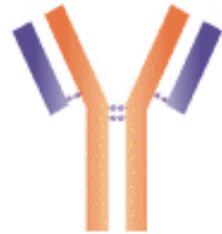
IgG



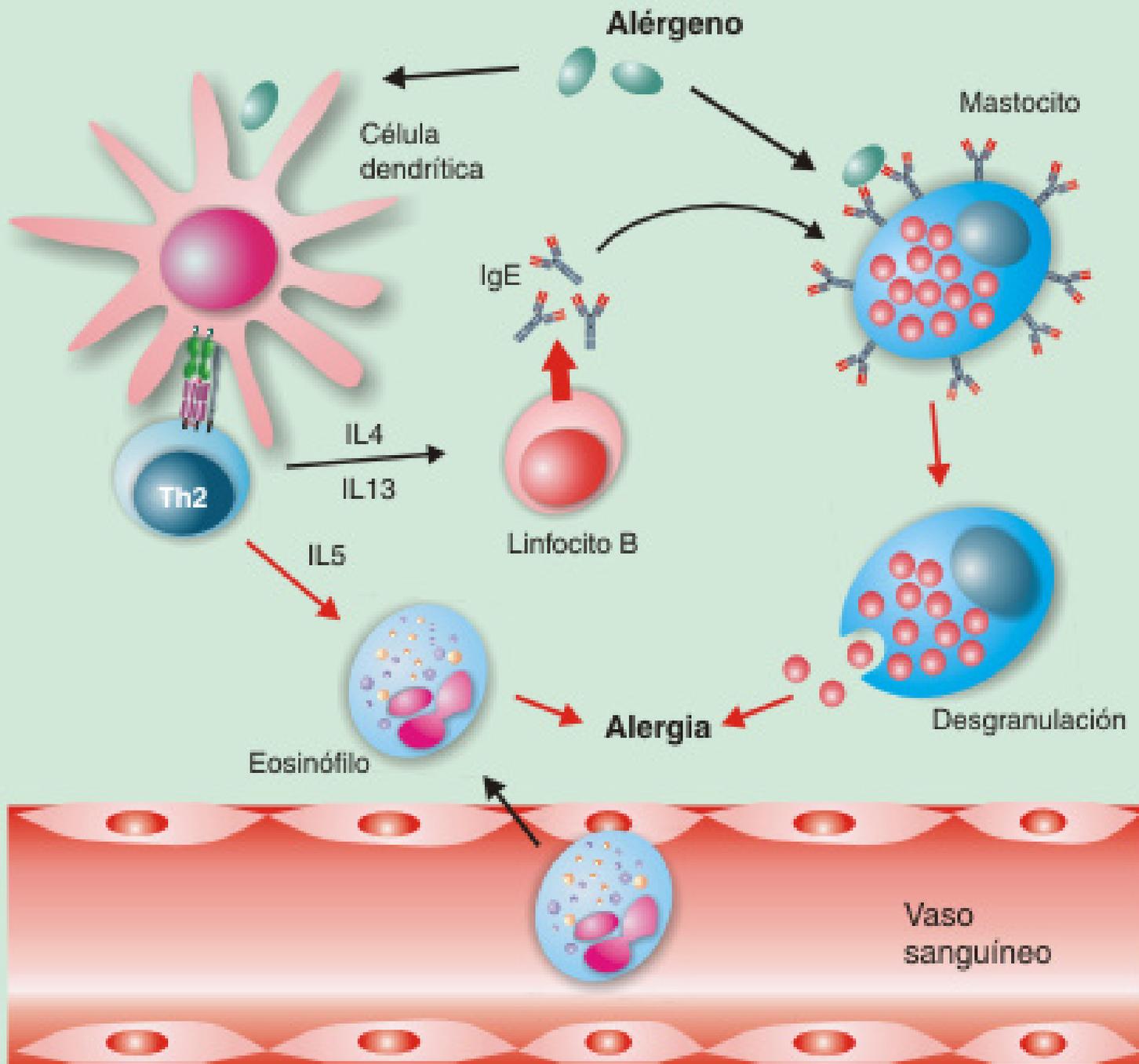
IgA



IgE



IgD



Clinical Manifestations of Altered Immunity in Autism



- ❑ Presence of allergies
- ❑ Sino-pulmonary infections, otitis, sinusitis, asthma
- ❑ Gastrointestinal symptoms: GERD, diarrhea, constipation, abdominal pain, flatulence; gastritis, colitis

ALL OF THE ABOVE MAY AFFECT BEHAVIOR

Prevalence of ASD in relatives of IgA-deficient patients

- Purpose: study the prevalence of ASD in offspring and siblings of IgA-deficient patients
- Study group: 31 IgA-deficient patients; 62 age and gender-matched controls
- Methods: questionnaire, medical records and interviews*

*Staff of Program of Autism and other Impediments, FILIUS Institute

RESULTS

Children affected with an ASD

Condition	# parents	# children with ASD	# children healthy
IgA def.	9 (100%)	1 (11.1%)	23(88.9%)
IgA def.+ allergies	20 (100%)	2 (10.0%)	61(90.0%)
Controls	61 (100%)	1 (1.6%)	192(98.4%)

Fisher's exact test: statistically significant

RESULTS

Siblings affected with an ASD

Condition	# with siblings	unaffected	affected
IgA def.	28	97(98.0%)	2(2.0%)
Control	60	216(0.5%)	1(0.5%)

Fisher's exact test: not statistically significant

CONCLUSIONS

- ❑ Study suggests that screening for an ASD is appropriate for children of IgA-deficient patients (10.3%)
 - ❑ Allergies occurred more commonly in the IgA-deficient group (71%)
 - ❑ A lower representation of ASD was noted in the IgA-deficient group as compared to other series (Gupta et al - 1996 report 20% in a series of 25 cases; Warren et al - 1997 report the same in a series of 40 patients)
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Allergic manifestations in children with autism spectrum disorders

- Purpose: evaluate the allergic manifestations in children with an ASD, with emphasis on food sensitivities
- Study group: 150 children screened for an ASD at the Evaluation Clinic of Program of Autism and other Impediments (PAI), FILIUS Institute
- Methods: questionnaire, medical records, and interviews*

* Staff of PAI, FILIUS Institute

Age Histogram

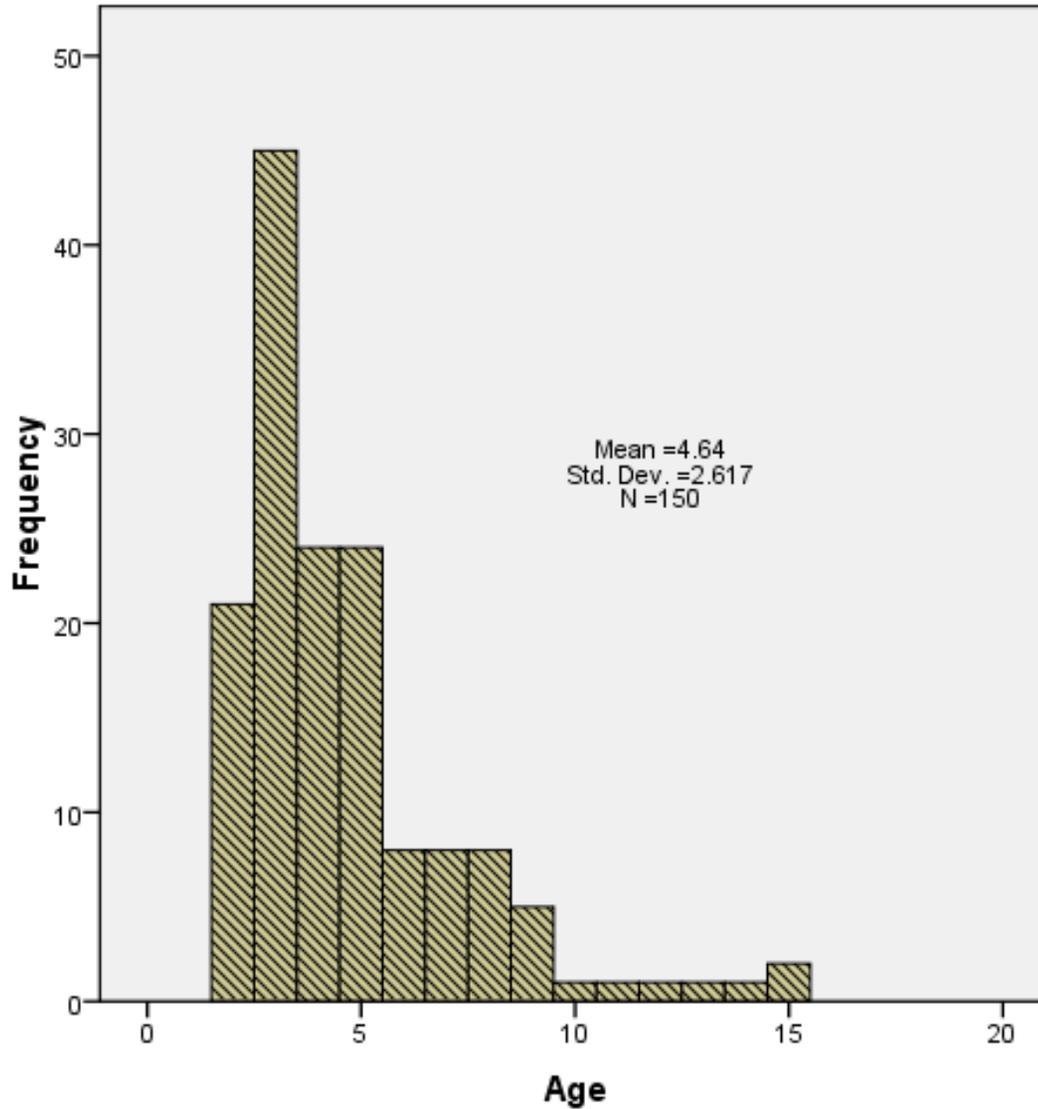
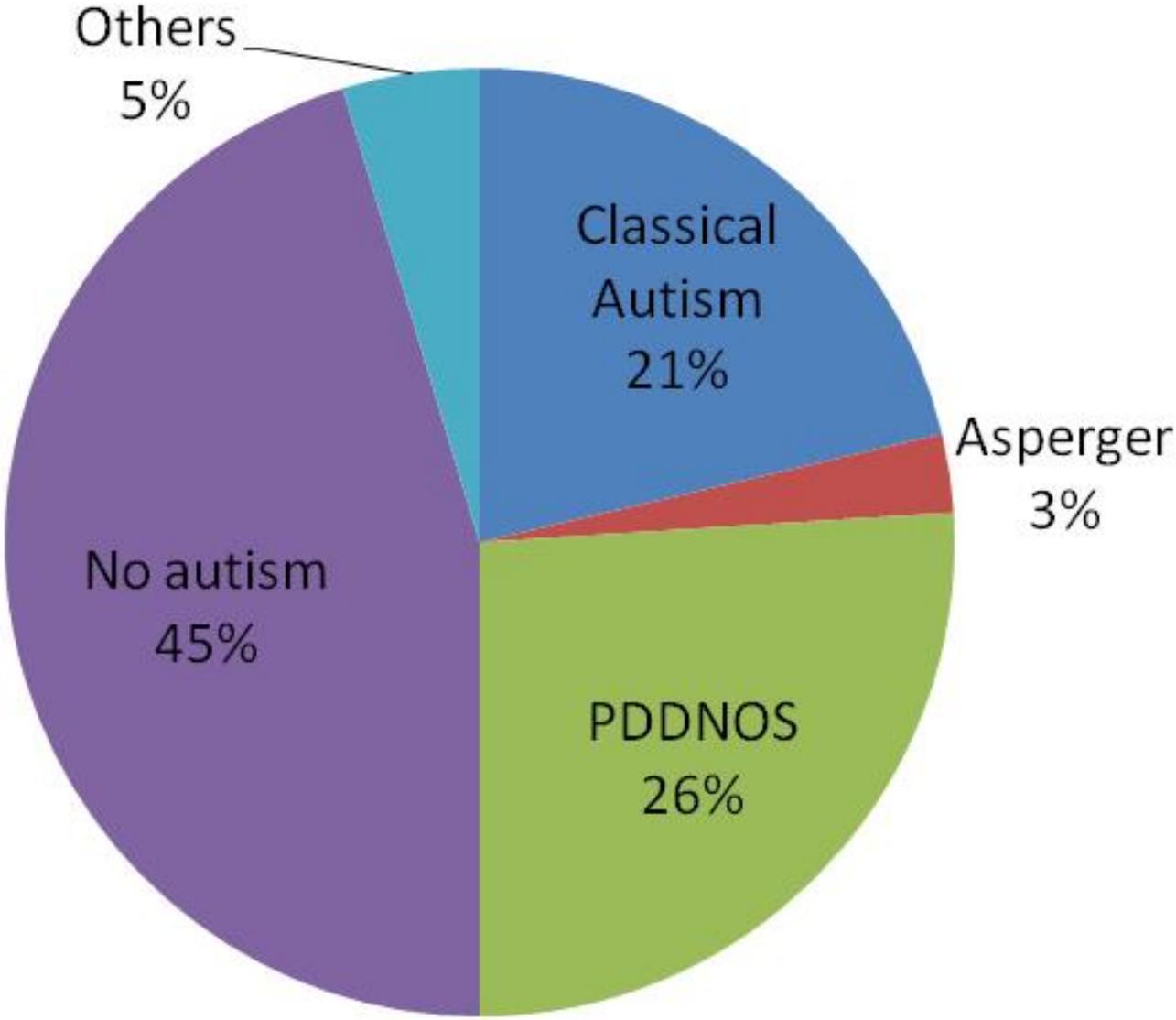
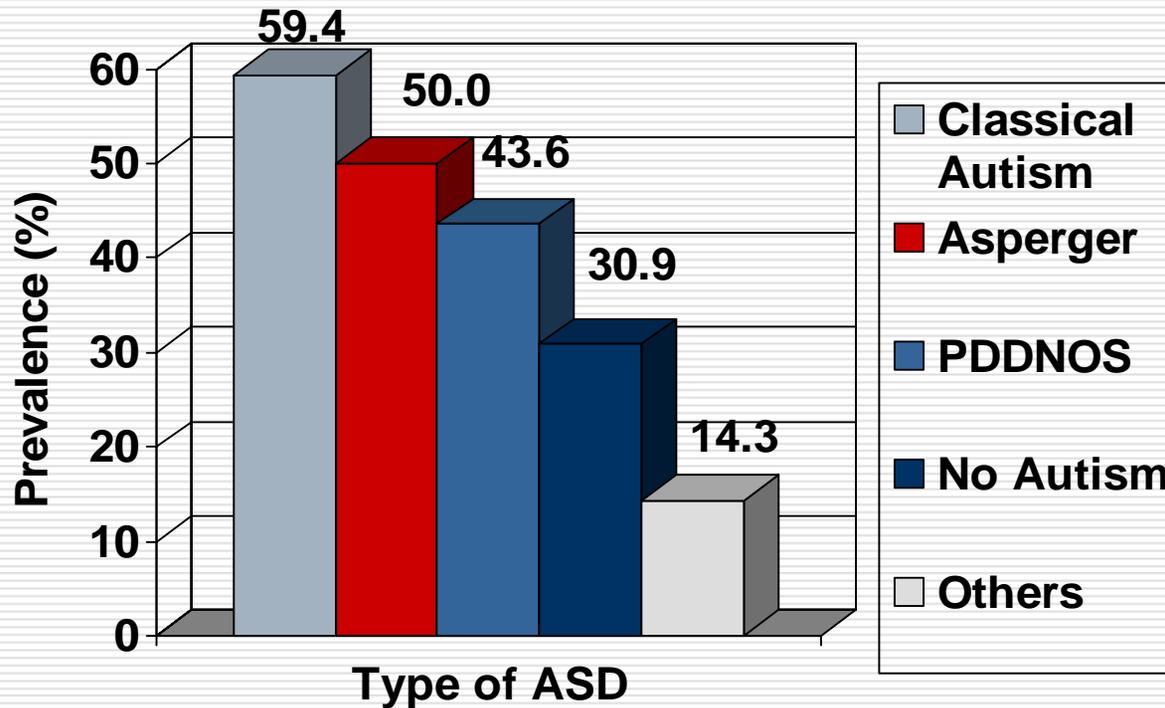


Figure 2. Autism spectrum disorders distribution (n = 150)



Prevalence of Allergies by Type of ASD



Type of allergy by ASD for those with allergy diagnoses (n = 57)

Diagnosis	ASD		
	Classic Autism	PDDNOS	No Autism
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Allergic rhinitis + asthma	10 (52.6)	12 (70.6)	11 (52.4)
Asthma	-	-	8 (38.1)
Allergic rhinitis + asthma + food	5 (26.3)	3 (17.6)	-
Food + medications	3 (15.8)	-	-
Food + asthma	-	1 (5.9)	2 (9.5)
Medication	-	1 (5.9)	-
Atopic dermatitis	1 (5.3)	-	-
Total	19 (100)	17 (100)	21 (100)

RESULTS

- ❑ Allergy prevalence was higher for children with an ASD (30.9 vs. 8.1% in controls)
- ❑ Allergic rhinitis and asthma were the more frequently encountered conditions
- ❑ Food allergy was identified more in ASD participants than in controls
- ❑ Milk and gluten were the most common sensitivities
- ❑ GI symptoms (abdominal pain, constipation, diarrhea, flatulence, GERD) were present in 32.9% of children with an ASD as compared to 7.3% in controls

DISCUSSION

- ❑ High prevalence of allergies in ASD in agreement with other studies (Mostafa et al 2008 - 52% vs. 10% controls; Department of Health - Puerto Rico - 2007 - 36.8% vs. 9.4%).
- ❑ Occurrence of food allergies in the ASD group is significant – most reports indicate that food allergies affect 4-5% of children
- ❑ Gastrointestinal symptoms in children with an ASD need to be correlated with IgA levels (Jyonouchi et al 2005)

CONCLUSIONS

- **More studies are needed to elucidate the role, if any, of allergies in the etiology of ASD**
 - **Observations have suggested a relationship between allergic immune responses to proteins or peptides ingested and the manifestations of ASD, especially those of the CNS**
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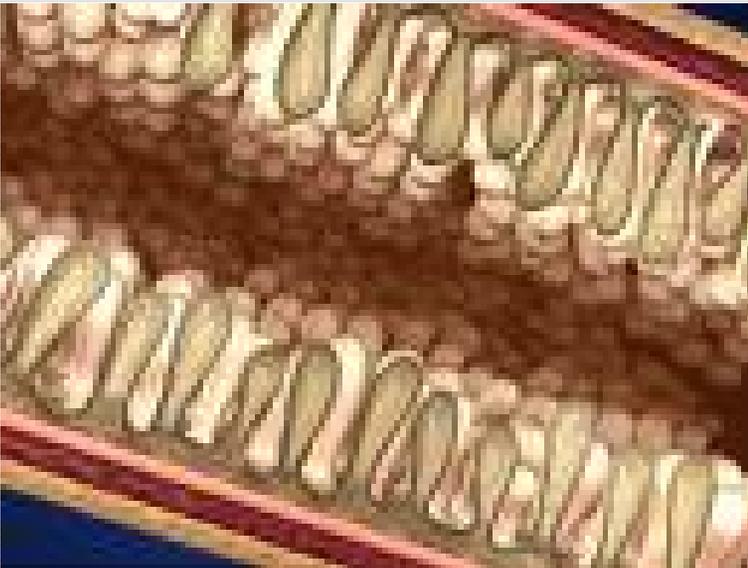
OBSERVATIONS

- 1) the levels of antibodies to specific dietary components such as casein, lactalbumin and beta-lactoglobulin are higher in autistic children than in control groups
- 2) antibodies to gliadin have cross-reactivity with anti-cerebellar antibodies
- 3) behavioral symptoms improve after elimination diets
- 4) brain autoantibodies are produced as a result of immune responses to dietary proteins
- 5) food peptides may exert toxic effects at the level of the central nervous system by interacting with neuro-transmitters, leading to disruption of neuroimmune communications
- 6) there is antigenic similarity between milk butyrophilin, casein and gliadin peptides with myelin basic protein, myelin oligodendrocyte, and cerebellar Purkinje cells

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