The Biomedical Approach
Dr. Antony Underwood

The Biomedical approach to Autism
Dr. Antony Underwood
M.B. B.S. (Syd.) FRACP

Biomedical Treatment of Autism
• Autism as a physical rather than a psychiatric disease
• Why the epidemic of Autism?
• Incidence as high as 1:100 children
• Boys:girls 4:1
• Cannot just be genetics, otherwise constant incidence eg Down's syndrome 1:600

Regressive Autism
• Most are normal at birth
• Normal in the first year of life
• Marked regression around 15-18 months
• Loss of eye contact, and speech
• Repetitive and self-stimulating behaviours

Physical Symptoms
• Poor sleep, often night waking either giggling and laughter or crying and head banging
• Red ears and red cheeks
• Bowel problems: either constipation or diarrhoea or alternation between either state
• Poor immune system: recurrent infections eg ear infections.

Physical Symptoms
• High pain tolerance
• Poor reaction to heat and cold
• Touch, taste and sound sensitivities
• Self restrictive diet (often focussed on cow's milk and wheat based foods)

Autism and the gut
• High percentage of autistic children respond to gluten and casein free diets
• Improved bowel function
• Improved language:
• Improved eye contact
• Improved social interaction
• Better sleep

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Will gfcf diet help?
- The only way is give the diet a trial for at least 3 months STRICTLY!!
- Clues it may be of benefit:
  - Regressive autism
  - Night waking, giggling or head banging
  - Constipation and/or diarrhea
  - Red ears and cheeks
  - Craves wheat and dairy products. (Addictive behaviors)

Opioid Excess Theory of Autism
- This is not an allergy but a drug effect of the foods
- Poor digestion of casein and gluten
- Inactive DPP4 enzyme
- Morphine like peptides e.g. casomorphine gliadomorphine
- Absorbed into the blood stream through leaky gut
- Cross the blood brain barrier and affect behavior.

Results
- More aware, less brain fog
- Better eye contact
- Language
- Decreased pain tolerance
- Red ears and cheeks cease
- Improved bowel function
- Better sleep

Other Foods
Sensitive to other foods?
- Refine the diet
- Elimination & rechallenge the gold standard of food sensitivities

Salicylates, Amines and Glutamates
- Important group
- Significant in 10%-20% patients
- Very high in tomatoes, strawberries, Broccoli, watermelon, kiwi fruit, grapes, sultanas etc.
- Symptoms: hyperactivity, ‘Jekyll & Hyde’ behaviour poor sleep and perioral rash
- Highly reactive to other chemicals, flavours, additives even Vit C
- Sue Dengate ‘Fed up’ RPAH allergy clinic

Tests
- Blood tests:
- RAST (good for allergies but not for food intolerances)
- IgG 93 food panel most accurate
- Skin prick tests:
  - often negative for food sensitivities, but good for nut, egg, external allergies.
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#### Intestinal function
- Most have increased intestinal permeability (leaky gut)
- Allows peptides into the blood then brain
- Overgrowth of yeasts eg candida
- Bacterial overgrowth especially gram negative bacteria
- Parasites: Blastocystis hominis, Dientamoeba fragilis & Giardia

#### Investigations
- **Stool tests:** ARL Melbourne, Metametrix (DNA), Bioscreen (Melbourne), Great Plains Laboratory USA.
- **Amino Acid Urine testing:** Bioscreen (Melbourne), Great Plains Laboratory USA, Metametrics.
  - Helpful in diagnosing upper GIT bacterial and yeast overgrowth

#### Unblock the bowel!!!
- These children are often chronically constipated
- Frequent slushy yellow stools despite constipation
- Abdominal x-ray
- Enemas, suppositories, stool softeners and bowel washouts are often needed

#### Treatment
- **Probiotics:** restore the normal bowel bacteria, Acidophilus, lactobacillis
- Avoid the use of broad spectrum antibiotics for viral infections
- **Prebiotics:** (gut repair agents) eg Ultra Probioplex, Replete, Colostrum Gold, Slippery elm powder

#### Anti fungal Treatment
- Reduce sugar and carbohydrates
- Olive leaf Extract
- Garlic
- Caprylic acid
- Pau Darco

#### Anti fungal drug Treatment
- **Nystatin:** need doses up to 500,000IU+/day in divided doses. Slowly increase because of ‘die off reaction’ typically day 3. Very safe not absorbed into the body.
- **Fluconazole, Itraconazole & Ketoconazole,** systemically absorbed can cause liver toxicity needs blood test to monitor
- **Saccharomyces Boulardii:** (Yeast) safe no side effects often very effective.
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**Antibiotic treatment**
- Vancomycin: powerful, not absorbed kills anaerobes clostridia. Short lived results during antibiotic treatment.
- Flagyl (Metronidazole) anaerobic infections
- Ciproxin active against resistant gram negative organisms

**Secretin**
- Gut neurotransmitter
- Triggered by acid secretion in the duodenum
- Excretion of pancreatic enzymes
- Bicarbonate
- Receptors found in the brain

**Secretin**
- Intravenously Most effective effects last 3-4 weeks Improved bowels, calmer more focused. After 8 rounds no further benefits
- Transdermal limited benefit
- Intra nasal ? Benefit

**Metallothionein Dysfunction**
- Short, cysteine rich proteins: 61-68 Amino Acids
- 4 types
- MT 1 & 2 are present in all cells in the body
- MT 3 is a neuronal growth inhibitory factor found primarily in the brain.
- MT 4 found mainly in the squamous epithelial of the upper GIT.

**MT dysfunction & Autism**
- Pfeiffer Treatment centre in Illinois
- 2000 study of 500 autistic children
- 99% chemical imbalances consistent with MT dysfunction.
- Abnormal copper to zinc ratios
- Normal is 1.1
- Autistic group 1.6

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MT functions

- Regulation of copper and zinc levels in the blood
- Detoxification of mercury and other heavy metals
- Development and functioning of the immune system
- Development and pruning of neurons
- Prevention of yeast overgrowth in the intestines.
- Production of enzymes which break down gluten and caesin

MT functions

- Taste and texture discrimination in tongue epithelia
- Hippocampus function & behaviour
- Development of emotional memory and socialization

Why MT dysfunction?

- Genetic predisposition for weak MT function
- Vaccines? MMR? Children with MT dysfunction more susceptible to vaccine reactions
- Heavy metals?
- Antibiotics (reduce Hg excretion by 10 fold)

Treatment of Metallothionien

- Phase 1
  - Zinc 50mg daily
  - Manganese 7.5mg
  - Magnesium 22mg
  - Pyridoxine 50mg
  - 5-P-5 (Vit B 6 active form) 50mg
  - Vit E 100 IU

Kyptopyrroluria

- Abnormal pyrroles in the urine
- Schizophrenics 40-70%
- Down syndrome 70%
- Autism 50%
- ADHD 30%
- Alcoholics 20-80%

Treatment of Metallothionien

- Phase 2
- After 3 months of intense zinc loading
- MTPromoter: Slowly introduced
- Amino acids:
  - Glutathione, Selenium, serine, lysine, alanine, glycine, Threonine, Proline, aspartic acid, asparagine, glutamic acid, Methionine, Glutamine, Isoleucine, Valine
# Clinical Symptoms

- Nail spots
- Pale skin
- Poor tanning
- Pain in the Knees & joints
- Constipation
- Light, smell, touch & sound hypersensitivity

# Symptoms

- Low stress tolerance
- Anxious, overly pessimistic
- Explosive anger
- Emotionally labile
- Social withdrawal
- Migraines
- Stitch in the side

# Diagnosis

- Clinical
- Mauve Urine test
- Very light and heat sensitive
- Needs to be collected under low light conditions and transported frozen to the lab
- Response to zinc and Vit B 6

# Treatment

- Pyridoxine-5- Phosphate  50mg
- Pyridoxine  250mg
- Zinc  50mg
- Response can be dramatic within days
- Calmer, fewer meltdowns, better focus

## Heavy metal toxicity

- Heavy metals can accumulate and cause gut, brain and immune dysfunction
- Typical heavy metals, mercury, arsenic, cadmium, antimony and lead
- Sources:
  - Environment: air and water pollution
  - Foods: Industrial waste recycled as fertilizers.
  - Dental amalgams

## Mercury toxicity

- Highly neurotoxic, kills brain cells
- ½ life in the brain is 40 years
- Individual sensitivity (some are highly sensitive to small amounts). Eg Pinks disease
- Lowers Immunity & predisposes to autoimmunity.
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Sources of Mercury
- Dental amalgams
- Fish: especially shark, tuna and swordfish
- Vaccines: added as a preservative thiomersal (mainly removed from vaccines in the last 2-3 years)
- Environment: coal fired power stations
- Mercury thermometers

Lead Toxicity
- Known neurotoxin
- No ‘safe limit’
- Reduces IQ
- 90% is in the bones.
- Sources:
  - Lead paint: banned in 1970 but still in old houses
  - Busy roads: Less risk now because leaded petrol is now replaced

Treatment of Heavy metal toxicity
- Avoidance of exposure
- Reduce ongoing exposure
- Supplements, Glutathione, selenium, Vitamin C, herbal liver support, detoxify programs
- Clatharating agents & Chlorella uncertain benefit

Treatment of Heavy metal toxicity
- DMSA orally/suppositories given in fortnightly intervals. Good for mercury & lead (10mg/kg TDS three days on & 11 days off)
- EDTA intravenously and suppositories (lead chelation)
- DMPS: Intravenously, suppositories, transdermal

Heavy Metal testing
- Blood tests: good for acute toxicity and ongoing exposure
- Hair test gives a longer over view
- Random Urine tests
- Provocation urine test with chelation agent eg DMSA or EDTA (the most accurate)

Oxidative stress Model of autism
- Genetic weakness results in oxidative stress
- Intestinal and brain barrier incompetence
- Environmental insult disables Metallothionein and glutathione

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Timing of stress:
• In utero: eg Hg poisoning: autism evident at birth: mental retardation often present
• After birth: Regressive autism
• After 2 years: speech delay

Antioxidant Therapies in autism
• Metallothionein promotion
• Chelation with DMSA, DMPS, EDTA
• Methyl B 12: 60mcg/kg subcutaneous injections every three days
• Transdermal or IV Glutathione
• Zinc, selenium, CoQ10, taurine, Vitamins A, C, D & E.
• Alpha lipoic acid
• Risperdal

Oxytocin
• 2006 Mt Sinai Medical school treated autism 15 patients intravenously
• Increased facial recognition
• Intranasal Oxytocin spray
• Released during breast feeding
• Increases bonding, trust and love

D-Cylcoserine treatment
• Antibiotic used in the treatment of tuberculous
• Augments the effects of behavioural treatment in Obsessive compulsive Disorder
• NMDA receptor (glutamate) agonist
• Pilot study 2004 increased social responsiveness and decreased social withdrawal in 40% of subjects.

Summary
Treat autism as a physical illness
Identify physical problems
Work through each area stepwise
Diet caesin & gluten free? Other foods
Leaky Gut treatment & repair
Metallothionein treatment
Heavy metal toxicity

Listen to the child’s expert
• Parents know their child very well
• The answers often lie in the history
• Careful observation
• Try one thing at a time
• ‘Start low and go slow with doses
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Further reading and resources

• ‘Children with Starving Brains’ Dr Jaquelyn McCandless
• Defeat Autism Now (DAN) conferences (audio & DVD)