Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

Patrick Holford - Food for the Brain Foundation, UK

Dysglycemia & metabolic Syndrome –the common factor in mental disorders

Brain Bio Centre

Do you have depression, anxiety, schizophrenia, memory loss, dementia, ADHD or autism or are you recovering from addictions?

The Brain Bio Centre offers:

State of the art treatment of mental health problems using the optimum nutrition approach

Full biochemical and psychometric testing before and after

Professional back up in consultation and by phone.

The Brain Bio Centre is at the Institute for Optimum Nutrition in Richmond, London

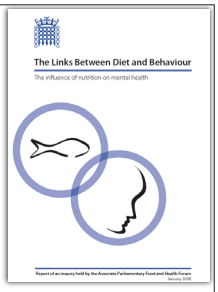
www.brainbiocentre.com

The Brain Bio Centre is a wholly owned subsidiary of the Food for the Brain Foundation

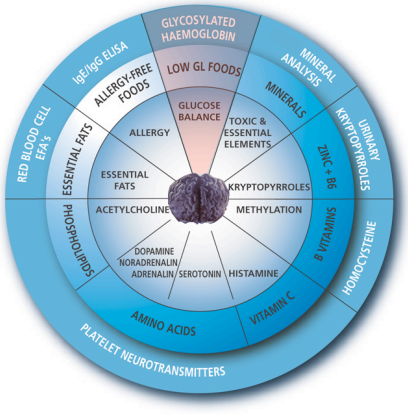
www.foodforthebrain.org

"A diet lacking essential nutrients is likely to have adverse consequences for brain function and thus mental health and behaviour…The evidence which has emerged to date of the links between nutritional status and childhood disorders, depression, aggressive and anti-social behaviour merits further publicly funded research…Because of the major potential benefit for the fields of education, crime, health and the well-being of vulnerable sections of society, we believe that more research is urgently needed in the area of nutrition and behaviour."

Associate Parliamentary Food and Health Forum, 2008



An Integral Model of Mental Health



There is a global epidemic of...

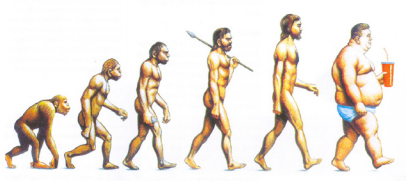
- Weight gain and obesity
- Diabetes
- Chronic fatigue
- Heart disease and stroke
- Breast and prostate cancer
- Depression
- Dementia
- Anxiety and aggression

Could all these health problems have a similar cause?

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

What are we programmed to eat?



Our genes have evolved during 7 million years

Food was scarce and we had to struggle physically to get hold of it

The World Health Organization (WHO):
Globally, overweight is a bigger problem than undernourishment

Obesity is the largest preventable cause of premature death after tobacco smoking

Overweight and obesity greatly increase risk of:

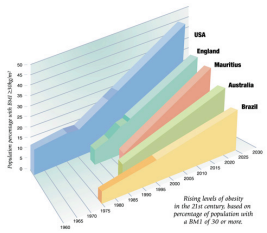
Diabetes (type 2)
Cardiovascular disease
High blood pressure
High cholesterol levels
Depression
Memory loss
Alzheimer's disease
Various cancers
Polycystic ovaries

The five symptoms that most predict...

- Waking up tired
- Can't get going without a tea, coffee or something sweet
- Need something sweet, or a coffee, at the end of a meal
- Energy slumps in the afternoon
- Feeling tired a lot of the time
- Feeling low

The "American paradox"

The traditional thinking has been to eat less calories from fat and more from carbohydrates. The result is that we do eat less fat and calories. Fat intake in US has decreased from 42 to 34 % of energy intake during last 30 years.



The Cholesterol Myth

- Overweight but otherwise healthy volunteers were fed **2 eggs a day for 12 weeks** while following a reduced calorie diet. A control group followed the same diet but cut out eggs altogether. Both groups lost weight and saw a **fall in their blood cholesterol.** (Ref: B Griffin European Journal of Nutrition, 2008)
- The odds are that if you have a heart attack you don't have high cholesterol. A massive US survey of 136,905 patients found that **75% of those hospitalised for a heart attack had perfectly normal cholesterol levels** and almost half had optimal cholesterol levels.
- Among elderly people **cholesterol is a very poor predictor of cardiovascular disease** death, as was a widely used index of conventional risk factors called the Framingham risk score, based on assessments of blood pressure, cholesterol, ECG, diabetes and smoking. **The best predictor by far is your homocysteine level.** If a person's homocysteine level was above 13, it predicted no less than two thirds of all deaths five years on. (W de Ruijter , *British Medical Journal*, Jan 2009)
- Almost half of people diagnosed as needing statins didn't need them at all! This was determined by actually scanning their arteries for plaque. **A quarter of the patients deemed as needing statins had no detectable plaque at all.** (K Johnson, *American Journal of Roentgenolog, Jan)*

Our diet has changed

Our diet is continuously drifting further away from what our genes once handled well

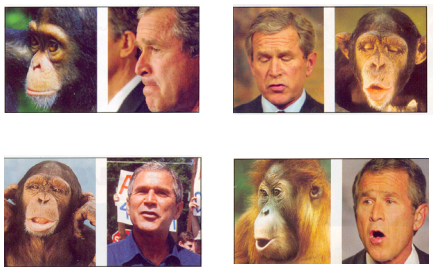
	The Stone Age	Today
Proteins	34%	13%
Fat	21%	35%
Carbs	45%	52%
Fiber	46g	21g/day
Sugar	0%	14%
Salt	1,7g	approx. 10g/day

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

1.2% sets us genetically apart from apes, but who is wiser?

Patrick**Holford**
100% health for life



13

Disglycemia • Metabolic syndrome • Insulin resistance

Glycation • Methylation • Inflammation • Liver disfunction

(HbA1c) (Homocysteine) (C-Reactive Protein) (AST, ALT)

Depression • Anxiety/Aggression • Dementia/Alzheimer's
Obesity • Diabetes • High cholesterol & Blood pressure
Heart disease • Polycystic ovarian syndrome

Metabolic Syndrome and Depression

- Non-depressed people with metabolic syndrome at baseline are twice as likely to have depressive symptoms at 7 year follow-up as compared with the nondepressed cohort without metabolic syndrome at baseline.
(Ref: Koponen H et al. J Clin Psychiatry. 2008)
- Positive associations found between depressive symptoms and insulin resistance among Chinese populations, aged 50-70.(Ref: Pan A et al. J Affect Disord. 2008)
- Should Depressive Syndromes Be Reclassified as "Metabolic Syndrome Type II"? says recent review.
(Ref: R McIntyre et al. Ann Clin Psychiatry. 2007)
- Diabetic women have nearly twice the risk of suffering from depression during or after pregnancy
(Ref: K Kozhimannil JAMA. 2009)

Metabolic Syndrome and Depression

- UK prospective cohort study - 5,232 particpants.
- Results: Presence of the metabolic syndrome was associated with an increased risk of future depressive symptoms, odds ratio 1.38 (95% CI 1.02-1.96) after adjustment for potential confounders. Of the five components, only central obesity, high triglyceride levels, and low HDL cholesterol levels predicted depressive symptoms. These components explained most of the association between the metabolic syndrome and the onset of depressive symptoms.
- Conclusions: Our results suggest that the metabolic syndrome, in particular the obesity and dyslipidemia components, is predictive of depressive symptoms.

Depression predicts metabolic syndrome in women

Finland prospective cohort study - 7 year follow up - 1,294 participants.

- RESULTS: The logistic regression analysis showed a 2.5-fold risk (95% CI: 1.2-5.2) for the females with depressive symptoms at baseline to have MetS at the end of the follow-up. The risk was highest in the subgroup with more melancholic symptoms. In men, there was no risk difference. CONCLUSION: The higher risks for MetS in females with depressive symptoms at baseline suggest that depression may be an important predisposing factor for the development of MetS.

Depression predicts metabolic syndrome

- US prospective cohort study - 429 women.
- Results: In women who were free of the metabolic syndrome at baseline, a lifetime major depression history or current major depressive episode at baseline was significantly associated with the onset and presence of the metabolic syndrome during the follow-up (odds ratio = 1.82; 95% Confidence Interval (CI) = 1.06-3.14). Survival analyses showed that, in women who were free of the metabolic syndrome at baseline, a lifetime major depression history or current major depressive episode at baseline predicted increased risk of developing the metabolic syndrome during the follow-up (hazard ratio = 1.66; 95% CI = 0.99-3.75).
- Conclusions: This study documents that major depression is a significant predictor of the onset of the metabolic syndrome.

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

Depression and metabolic syndrome

- Finland prospective cohort study - 921 participants.

RESULTS: In women, depressive symptoms were associated with increased risk of the metabolic syndrome in adulthood (odds ratio for NCEP metabolic syndrome per 1 SD increase in depressive symptoms 1.40, 95% confidence interval 1.05-1.85). The metabolic syndrome in childhood, in turn, predicted higher levels of depressive symptoms in adulthood ($p = .03$). In men, no associations were found between depressive symptoms and the clinical definitions of the metabolic syndrome.

CONCLUSION: The process linking depressive symptoms with the metabolic syndrome may go into both directions and may begin early in life.

Depression predicts metabolic syndrome

- Finland prospective cohort study - 7 year follow up - 225 participants.

RESULTS: The prevalence of MetS was 49% in men and 21% in women. Men with MetS had higher rates of major depressive disorder than other men. They also displayed higher Hamilton Rating Scale for Depression (HDRS) scores and more often signs of suicidality. In logistic regression analyses, higher HDRS scores (OR 1.31, 95% CI 1.04-1.64) and belonging to the HMS group (OR 10.1, 95% CI 1.98-51.3) were independent associates for MetS but only in men.

CONCLUSION: The results highlight that there is an association between long-term depressive symptoms and the emergence of MetS, especially in men.

Metabolic Syndrome and Memory

- Older women with metabolic syndrome are almost twice as likely to develop cognitive impairment over a four year period
- The fatter the man the worse their memory becomes with age.
- Insulin resistance increases risk for heart disease and for dementia.

Metabolic Syndrome and Mental Illnesss

RESULTS: Among patients with mental illness prevalence of metabolic syndrome was 54% overall, and highest among patients with bipolar disorder or schizoaffective disorder (both 67%), followed by schizophrenia (51%). Sociodemographic variables, including age and ethnic background, were not significantly associated with metabolic syndrome, but a strong association was seen with mean body mass index. Other cardiovascular risk factors, such as smoking and substance misuse, were common among participants.

CONCLUSIONS: Prevalence of metabolic syndrome in this population was almost double that in the general Australian population, and patients with schizophrenia had a prevalence among the highest in the developed world. Prevalence was also high in patients with a variety of other psychiatric disorders.

Glycosylated Haemoglobin (HbA1c)

- Glycosylation is the process by which glucose peaks in the bloodstream damage tissue - from arteries to eyes, kidneys and brain
- Glycosylated haemoglobin is damaged red blood cells - the more you have the more peaks in blood sugar levels you're having, indicating poor blood sugar control eg insulin isn't doing it's job properly.
- A score above 7 indicates significant risk for diabetes
- A score above 6 indicates significant risk loss of blood sugar balance
- A score below 5 indicates very good blood sugar control
- You can test this on a simple home test kit from www.yorktest.com

GLCheck
manage your blood sugar & improve your health

HbA1c and Depression

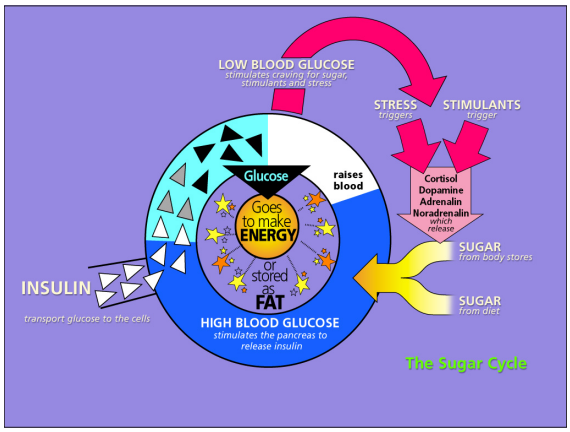
- US prospective cohort study - 11,525 diabetic veterans

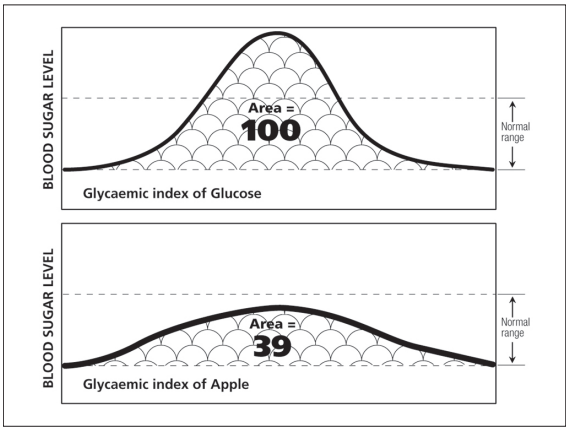
RESULTS: The adjusted mean HbA(1c) values over time were significantly higher in depressed vs. nondepressed subjects (mean difference of 0.13; 95% CI [0.03; 0.22]; P=.008). In all adjusted models, differences in mean HbA(1c) values were significantly higher in depressed vs. nondepressed subjects with Type 2 diabetes.

CONCLUSION: This study of veterans with Type 2 diabetes demonstrates that there is a significant longitudinal relationship between depression and glycemic control as measured by HbA (1c) and that depression is associated with persistently higher HbA(1c) levels over time.

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford





Glycemic Index of Foods

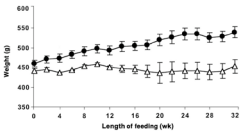
Slow Releasing Foods		Fast Releasing Foods	
Fructose	20	Sucrose	59
Oats	49	Cornflakes	80
Apple	39	Banana	62
Pear	38	Raisins	64
Wholegrain rye bread	41	White bread	70
Wholewheat spaghetti	42	White spaghetti	50
Brown basmati rice	58	White rice	72
Sweet potato	54	Potato(baked)	85
Oat cake	55	Chocolate	49
Carrots	47	Rice cake	81
Apple juice	40	Fanta	68

Glycemic Index of Foods

Slow Releasing Foods		Fast Releasing Foods	
Fructose	20	Sucrose	59
Oats	49	Cornflakes	80
Apple	39	Banana	62
Pear	38	Raisins	64
Wholegrain rye bread	41	White bread	70
Wholewheat spaghetti	42	White spaghetti	50
Brown basmati rice	58	White rice	72
Sweet potato	54	Potato(baked)	85
Oat cake	55	**Chocolate**	**49**
Carrots	**47**	Rice cake	81
Apple juice	40	Fanta	68

Low GL diets cause more weight loss on identical calories

Animals fed high calorie diets providing the identical number of calories show much less weight gain and fat gain on a low GL diet. By the end of 32 weeks, **the low-GL group were not only 14 per cent lighter – they also had 29 per cent less body fat!**



According to the authors **"Overweight or obese people lost more weight on a low Glycaemic Load diet and had more improvement in lipid profiles than those receiving conventional diets."** The review compared the results of six well designed trials comparing low GL diets with conventional diet, based on reducing calories. Other benefits were greater loss in body fat, reductions in bad 'LDL' cholesterol, and increase in good 'HDL' cholesterol.

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

Holford Low GL Diet works

- Sixteen people were placed on the Holford Low GL Diet for eight weeks. The average weight loss was a highly significant 10.25lbs, equivalent to 1.3lbs per person per week. Body fat percentage dropped by an average of 2%.
- In addition, 94% reported greater energy, 67% had greater concentration, memory or alertness, 67% had less indigestion or bloating, clearer and less dry skin , 50% reported fewer feelings of depression and more stable moods.
- There was also a significant drop in blood pressure.

The Glycaemic Load
of a food is derived from knowing both the
QUALITY
of the carbohydrate (its GI - fast or slow.)
and the
QUANTITY
of the food that is carbohydrate

Glycemic Load

The GL of a food is worked out as follows:

- GI score (divided by 100) multiplied by the available carbohydrate (carbohydrates minus fibre) in grams.
- *Take watermelon as an example:*
  Its glycemic index (GI) is pretty high, about 72.
  A serving of 120 grams has 6 grams of available carbohydrate per serving, so its Glycemic Load is...
- 0.72 x 6 = 4.32, rounded to 4, per serving.

Breakfast	GL
A bowl of porridge	2
Half a grated apple	3
A small tub of yoghurt	2
and some milk	2
subtotal	9
Snack	
A punnet of Strawberries	5
Lunch	
substantial tuna salad, plus 3 oatcakes	10
Snack	
a pear and some peanuts	4
Dinner	
Tomato Soup, salmon sweet corn, green beans	12
GOOD DAY TOTAL	GL 40

Breakfast	GL
A bowl of Cornflakes	21
a banana	12
milk	2
subtotal	35
Snack	
Mars Bar	26
Lunch	
Tuna Salad Baguette	15
Snack	
Bag of crisps	11
Dinner	
Pizza with parmesan cheese and tomato sauce and some salad	23
BAD DAY TOTAL	GL 110

Three simple rules

- **Eat no more than 40/60 GLs a day.**
- **Eat protein with carbohydrate.**
- **Graze rather than gorge.**

Graze don't Gorge

10 GLs for breakfast
+5 GLs snack
+10 GLs for lunch
+5 GLs snack
+10 GLs for dinner
(+5 GLs for drink/dessert)

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford

Three simple rules

- **Eat no more than 40/60 GLs a day.**
- **Eat protein with carbohydrate.**
- **Graze rather than gorge.**

Carbohydrates		Protein
Cereal/Fruit	+	Seeds/Yoghurt/Milk
Fruit	+	Yoghurt/Seeds
Bread/Toast	+	Egg
Bread/Toast	+	Fish (eg Kippers)

Breakfast

CEREAL	5 GLs
Oat flakes	2 servings
All Bran	1 serving
Muesli (no sugar)	1 small serving
Alpen	Half a serving
Raisin Bran	Half a serving
Weetabix	1 biscuit
Cornflakes	Half a serving

FRUIT	5GLs
Berries	1 large punnet
Pear	1
Grapefruit	1
Apple	1 small
Peach	1 small
Banana	third
Raisins	10

Breakfast

BREADS	10 GLs
Nairns rough oatcakes	5/6 biscuits
Rye 'Pumpernickel' style	2 thin slices
Sourdough rye bread	2 thin slices
Rye wholemeal bread (yeasted)	1 slice
Wheat wholemeal bread (yeasted)	1 slice
White, high fibre bread (yeasted)	<1 slice

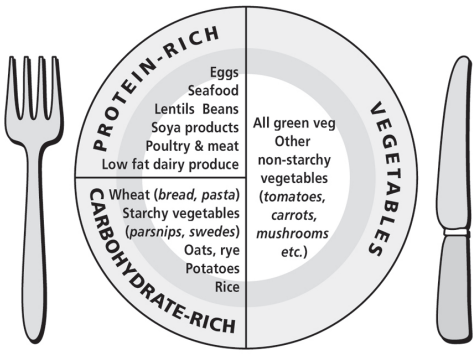
- Oats, or specifically oat bran, contain a powerful anti-diabetes nutrient called beta-glucan. Diabetic patients given oatmeal or oat-bran rich foods experience much lower rises in blood sugar. In fact, 10 per cent of your diet as beta-glucans can halve the blood sugar peak of a meal.
- Practically, that means eating half oat flakes, half oat bran, cold or hot as porridge, with a low-GL fruit such as berries, pears or apples and snacking on rough oat cakes (which have the most beta-glucans). With over 1,000 studies on beta-glucans, the evidence really is overwhelming. Oats are also low GL.
- This level of effect is far greater than you'll get from taking metformin, at a fraction of the price and with none of the side effects.

Breakfast

BREADS	10 GLs
Nairns rough oatcakes	5/6 biscuits
Rye 'Pumpernickel' style	2 thin slices
Sourdough rye bread	2 thin slices
Rye wholemeal bread (yeasted)	1 slice
Wheat wholemeal bread (yeasted)	1 slice
White, high fibre bread (yeasted)	<1 slice

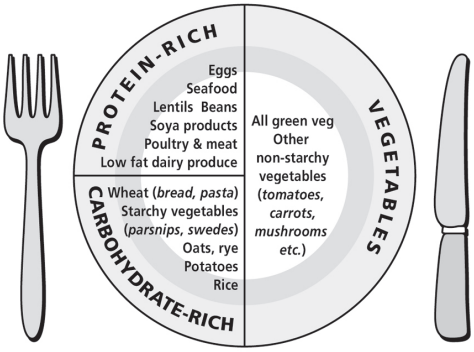
Snacks

- A piece of fruit, plus five almonds of a dessertspoon of pumpkin seeds
- A piece of bread or two oat cakes and half a small tub of cottage cheese (150g)
- A piece of bread/two oat cakes and half a small tub of hummus (150g)
- A piece of bread/two oat cakes and peanut butter
- Crudites (a carrot, pepper, cucumber or celery) and hummus
- Crudites and cottage cheese
- A small yoghurt (150g) , no sugar, plus berries
- Cottage cheese plus berries



Starchy veg/grains - 7GLs

Pumpkin/squash	Big serving (186g)	Brown rice	Small serving (70g)
Carrot	One large (158g)	White rice	Third serving (46g)
Swede	Big serving (150g)	Couscous	Third serving (46g)
Quinoa	Big serving (120g)	Broad beans	A serving (31g)
Beetroot	Big serving (112g)	Sweetcorn	Half a cob (60g)
Cornmeal	A serving (116g)	Boiled potato	Three small (74g)
Pearl barley	Small serving (95g)	Baked potato	Half (59g)
Wholemeal pasta	Half serving (85g)	French fries	Tiny portion (47g)
White pasta	Third serving (66g)	Sweet potato	Half (61g)



Coffee & croissant - a deadly duo?

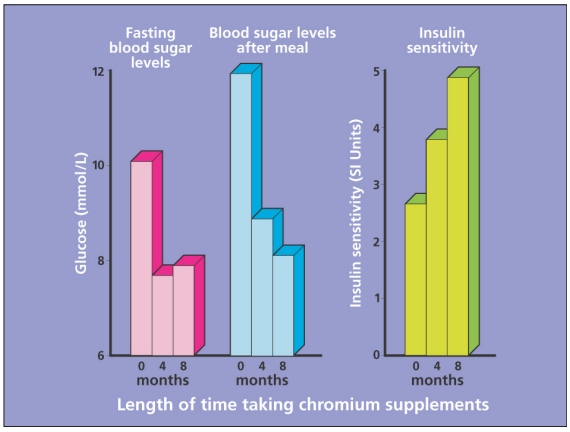
Britain's most popular pick-me-up, a coffee and a croissant, may be fuelling an epidemic of weight gain and diabetes, according to research at Canada's University of Guelph. Participants were given a carbohydrate snack, such as a croissant, muffin or toast, together with either a decaf or coffee. **Those having the coffee/carb combo had triple the increase in blood sugar levels** and insulin sensitivity, the hormone that controls blood sugar levels, was almost halved.

Chromium improves glucose balance

By 2006 there had been over 20 high quality trials on chromium and type 2 diabetes, the majority of which have shown extremely positive effects.

Dysglycemia-The Common Factor in Mental Disorders

Patrick Holford



Chromium improves glucose balance

- By 2006 had been over 20 high quality trials on chromium and type 2 diabetes, the majority of which have shown extremely positive effects. (Ref: Broadhurst, Diab.Technol.Thera 2006)
- A systematic review in the top diabetes journal Diabetes Care, concludes: "Among participants with type 2 diabetes, chromium supplementation improved glycosylated hemoglobin levels and fasting glucose. Chromium supplementation significantly improved glycemia among patients with diabetes." (Ref: Balk, Diabetes Care 2007)
- A recent study gave healthy, overweight women chromium or placebo for eight weeks. Those on chromium ate less, felt less hungry, craved fat less and also lost more weight than those taking the placebos. (Ref: Anton, Diab.Technol.Thera.2008)

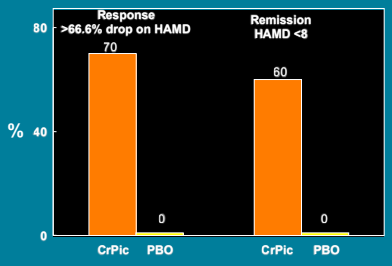
- Mood reactive
- Excessive appetite or weight gain
- Unexplained exhaustion
- Daytime sleepiness or "grogginess"
- Excessive sensitivity to rejection

- Mood fixed
- Weight loss, anorexia
- Agitation
- None
- Less rejection sensitive

Identified Drs. E.D. West and P.J. Dally* at St.Thomas's Hospital, London

15% to 29% of patients with major depressive disorder have atypical depression.

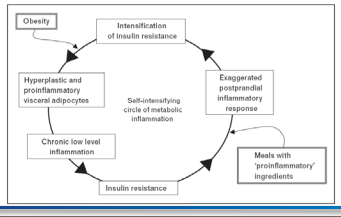
Response and Remission Rates: Cr Picolinate in Atypical Depression



(Ref: Davidson et al. Biol Psych, 2003)

A high Ω3/6 ratio reduces post-prandial inflammation

- A higher intake of omega 3 (both fish oils and alpha-linolenic acid) offset the inflammatory effect of a meal, lowering CRP.
- Obesity and insulin resistance increase inflammatory responses in a vicious cycle that promotes obesity and insulin resistance



ACTION for sugar balance

PatrickHolford
100% health for life

- Follow a low GL diet, high in omega 3 fats
- Increase exercise
- Chromium 200-600mcg
- Basic supplements (multivit/min inc Zn,Mg, vit C, omega 3)
- 3 x tyrosine 500mg, empty stomach, if coming off caffeine