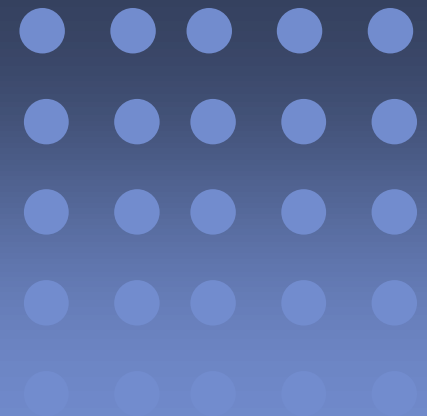




The Virtues of Fat



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White Uakari Monkey





Red = Beauty

White Uakari Monkeys live in tree tops in with malaria mosquitoes. When infected their faces lose colour. A red face is a sign of health, strength and virility, and therefore:

Red = Beauty



Fat is Beautiful

Humans use fat as a marker of health, strength and fertility. Therefore:

Fat = Health = Beauty

Fat is Fertility

Fat Transfer



Fat and Fertility



The Appearance of Illness



Chronic Illness or Ageing?



Twins....Smoker



CO2 Fractional Laser + Fat Transfer



Dr Ralph T Bright



Fat Transfer





Functions of Fat

- Calorie storage no longer so important
- Temperature control / insulation
- Defense against infection / infestation
- Important for innate Immunity
- Source of Regenerative Stromal and Stem cells
- Role in mating



Leptin

- Leptin is released into the circulation from fat in proportion to the fat mass.
- Leptin triggers an inflammatory response to combat infection, increase metabolism, and decrease appetite.
- No fat equals no Leptin and a very poor response to infection with increased mortality.
- Increase BMI = Increase Leptin = Increase Inflammation



Fat Fights Infection

- Adipocytes are more responsive to endotoxins and some bacterial wall components than macrophages. They are also highly sensitive to fungal cell wall components producing high levels of proinflammatory cytokines
- Destroying all the fat cells severely compromises response to major infection resulting in mortality

Pajvani, U. B., M. E. Trujillo, T. P. Combs, P. Iyengar, L. Jelicks, K. A. Roth, R. N. Kitsis, and P. E. Scherer. 2005.

Fat apoptosis through targeted activation of caspase 8: a new mouse model of inducible and reversible lipoatrophy.
Nat. Med. 11:797–803.



Fat transfer



No feeling



Uncomfortable after first



Needs anaesthesia
after third

A Landmark Paper

TISSUE ENGINEERING
Volume 7, Number 2, 2001
Mary Ann Liebert, Inc.

Multilineage Cells from Human Adipose Tissue: Implications for Cell-Based Therapies

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ABSTRACT

Future cell-based therapies such as tissue engineering will benefit from a source of autologous pluripotent stem cells. For mesodermal tissue engineering, one such source of cells is the bone marrow stroma. The bone marrow compartment contains several cell populations, including mesenchymal stem cells (MSCs) that are capable of differentiating into adipogenic, osteogenic, chondrogenic, and myogenic cells. However, autologous bone marrow procurement has potential limitations. An alternate source of autologous adult stem cells that is obtainable in large quantities, under local anesthesia, with minimal discomfort would be advantageous. In this study, we determined if a population of stem cells could be isolated from human adipose tissue. Human adipose tissue, obtained by suction-assisted lipectomy (*i.e.*, liposuction), was processed to obtain a fibroblast-like population of cells or a processed lipoaspirate (PLA). These PLA cells can be maintained *in vitro* for extended periods with stable population doubling and low levels of senescence. Immunofluorescence and flow cytometry show that the majority of PLA cells are of mesodermal or mesenchymal origin with low levels of contaminating pericytes, endothelial cells, and smooth muscle cells. Finally, PLA cells differentiate *in vitro* into adipogenic, chondrogenic, myogenic, and osteogenic cells in the presence of lineage-specific induction factors. In conclusion, the data support the hypothesis that a human lipoaspirate contains multipotent cells and may represent an alternative stem cell source to bone marrow-derived MSCs.

What Cell Would You Like?

ZUK ET AL.

TABLE 1. LINEAGE-SPECIFIC DIFFERENTIATION INDUCED BY MEDIA SUPPLEMENTATION

<i>Medium</i>	<i>Media</i>	<i>Serum</i>	<i>Supplementation</i>
Control	DMEM	10% FBS	none
Adipogenic (AM)	DMEM	10% FBS	0.5 mM isobutyl-methylxanthine (IBMX), 1 μ M dexamethasone, 10 μ M insulin, 200 μ M indomethacin, 1% antibiotic/antimycotic
Osteogenic (OM)	DMDM	10% FBS	0.1 μ M dexamethasone, 50 μ M ascorbate-2-phosphate, 10 mM β -glycerophosphate, 1% antibiotic/antimycotic
Chondrogenic (CM)	DMEM	1% FBS	6.25 μ g/ml insulin, 10 ng/ml TGF- β 1, 50 nM ascorbate-2-phosphate, 1% antibiotic/antimycotic
Myogenic (MM)	DMEM	10% FBS, 5% HS	0.1 μ M dexamethasone, 50 μ M hydrocortisone, 1% antibiotic/antimycotic

The Power of Fat

Prof Bill Walsh – Director, Orthopaedic Research Unit, POW Hospital, Sydney.

Makes bone from fat

Experience in Dogs





Macquarie Cosmetic Medicine

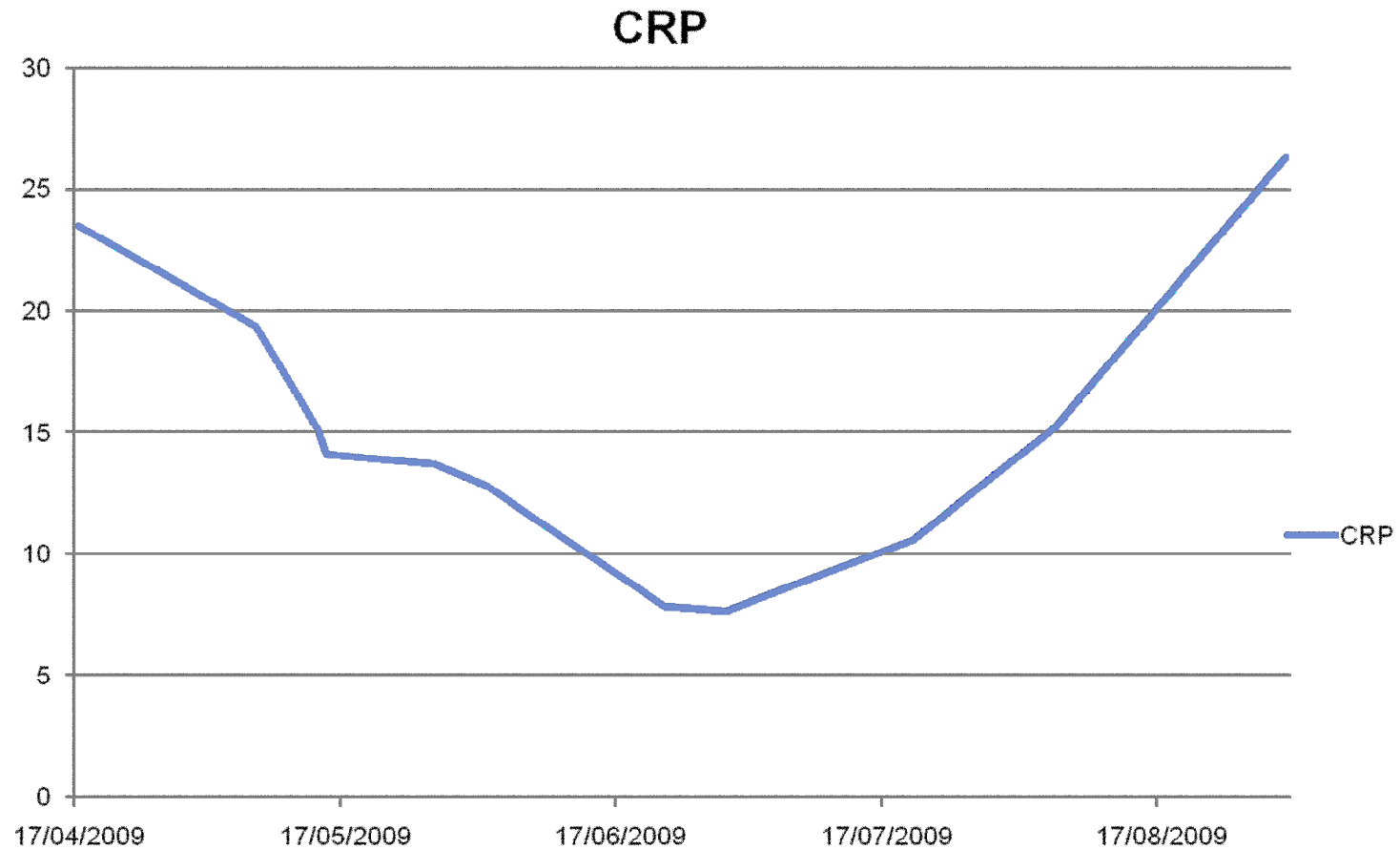
- On the 17th of April 2009 we performed our first stem cell transfer
- We believe this is the first person in Australia to be treated with adipose derived stem cells
- We have now treated eleven people. All have improved. None have had any significant adverse events



Adverse and Other Effects

- Two patients had transient joint swelling lasting up to 2 weeks
- All spine pain improved some totally
- Asthma in remission
- Rh. arthritis in remission
- Tendonitis pain free
- Depression resolved

Change in Systemic Inflammation





Uses So Far

- Osteoarthritis
 - very successful unless bone on bone
- Rheumatoid Arthritis
 - some improvement
- Asthma
 - good response
- Rotator cuff syndrome
 - good response
- Multiple Sclerosis
 - Bristol study
 - Ben Lahey, Canberra
- Diabetes
 - India
- Parkinsons
 - Xcell centre
- Cerebral Palsy
 - Xcell centre, 70



Fat is a Double Edged Sword

Weisberg, S. P., D. McCann, M. Desai, M. Rosenbaum, R. L. Leibel, and A. W. Ferrante, Jr. 2003. **Obesity is associated with macrophage accumulation in adipose tissue.** J. Clin. Investig. 112:1796–1808.

Xu, H., G. T. Barnes, Q. Yang, G. Tan, D. Yang, C. J. Chou, J. Sole, A. Nichols, J. S. Ross, L. A. Tartaglia, and H. Chen. 2003. **Chronic inflammation in fat plays a crucial role in The Development of obesity-related insulin resistance.** J. Clin. Investig. 112:1821–1830

Mohamed-Ali, V., S. Goodrick, A. Rawesh, D. R. Katz, J. M. Miles, J. S. Yudkin, S. Klein, and S. W. Coppack. 1997. **Subcutaneous adipose tissue releases interleukin-6, but Not Tumor Necrosis factor-alpha, in vivo.** J. Clin. Endocrinol. Metab. 82:4196–4200.

Uysal, K. T., S. M. Wiesbrock, M. W. Marino, and G. S. Hotamisligil. 1997. **Protection From obesity-induced insulin resistance in mice lacking TNF- α function.** Nature 389:610–614.

Everything in Moderation

news 9



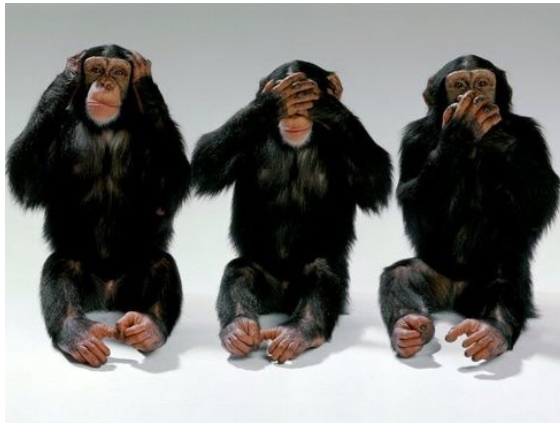
Excess weight takes years off life

UNPUBLISHED Australian research presented at the *Obesity: The Reality Check* symposium last week in Sydney has revealed the effect obesity can have on a normal lifespan.

Associate Professor Bruce Neal, a senior director at The George Institute for International Health at the University of Sydney, said a meta-analysis of 900,000 patients revealed people with a BMI of 30-35 kg/m² would lose three years of life compared to those with a BMI of 24 kg/m². Those with a BMI between 40 and 50 kg/m² would lose a decade on average.

The Virtue of Fat

3 Wise Monkeys



Fat Wise Monkey?



Red Face Wise Monkey





Protect Your Fat

Declining sex steroids

- Testosterone, oestrogen, androstenedione, also growth hormone (Anabolic)

Obesity

Smoking

Subclinical and overt infections

Increasing BMI

Arteriosclerosis

Exercise

Diet

- Glucose
- Excess calories



What I Take

Only two things have been proven to extend life, calorie deprivation and Resveratrol

Resveratrol protects against the damage of inflammation

Paul T. Pfluger*, Daniel Herranz[†], Susana Velasco-Miguel[†], Manuel Serrano^{†,‡}, and Matthias H. Tschöp Sirt1 protects against high-fat diet-induced metabolic damage PNAS

Omega 3 (fish oil) - 400mg per day if you are healthy and 600mg per day if you have a problem