BRITISH medal-winning Olympic athlete Jenny Meadows has become the first sportsperson in the world publicly to reveal the secrets of her DNA and is now using a revolutionary genetic test to help her achieve gold at the Commonwealth Games.

Jenny, who won world indoor silver at the 2010 championships in Doha followed by European indoor gold and silver in Paris over 800m and the 4x400m relay respectively, is the first professional athlete ever to publish the results of her DNA test. It reveals information about how her body responds to training, its ability to recover from exercise and its risk of soft tissue injury.

The genetic data has been provided by DNAFit – a British nutrigenetics company that tests 45 gene variants scientifically linked to a body’s capacity to respond to training and nutrition. The genes include ACTN3 – known as the Power Gene.

Over the past decade over a hundred studies have reported significant associations between genetic variations and power / endurance performance and response to training.

DNAFit has carefully selected 18 of these genetic variations for which consistent associations have been demonstrated and created the unique DNAFit Fitness test.
It uses validated genetic variant scoring methods to determine an individual’s genetic power/endurance balance score to help devise personal training programmes.

Jenny has an almost equal balance between power and endurance, which is ideal for her chosen distance. However Jenny’s test also discovered her injury risk and recovery times are higher than average. These results have led her to make drastic modifications to her training.

The test revealed that:

- Jenny, who started out as a 400m runner but graduated to become a champion at 800m, has an even split of both power and endurance: **48.8% power, 51.2% endurance. This is perfect for her chosen distance**

- Her aerobic potential (VO2 max potential) was found to be **medium**. To increase her VO2 max capacity, she needs to cross-train by consistently including both endurance and power activities in her training programme.

- Her post exercise recovery profile was found to be **fast**. This means she can recover quickly after very little rest and do more training.

- But her potential injury risk was found to be **high**. That means she has a genetically higher risk of a sports related soft tissue injury. This should be taken into consideration when planning training schedules. Jenny has been dogged by injuries over the years.

Dr. Keith Grimaldi, DNAFit’s Chief Scientific Officer who developed the test, said:

“Jenny’s power/endurance genetic profile is uncannily similar to the demands of her event as a middle distance runner - equal amounts of both power and endurance, with just a slight emphasis on endurance.

“We know that she moved up to 800m from 400m and this is when she really made a breakthrough as an athlete. She has the power potential to excel as a sprinter but benefits from almost the same amount of endurance potential to excel at the longer 800m distance.

“Her fast recovery speed has meant she was able to put in a very large training and mileage load upon starting the historically very difficult ‘switch-up’ from 400m. Her extra strong aerobic endurance potential is testament to her ability to do a very large amount of training day in day out to reach world-class.

“However, she does need to be extra careful to avoid injury, through considered injury prevention work and physiotherapy as a result of her higher than average genetic injury risk. This is backed up by her recent injury struggles, notably missing the London 2012 team due to an achilles problem. This can be helped by doing a lot of pre-habilitive exercise.

“Finally her results also indicated a raised requirement for dietary antioxidants and recommended daily levels of omega 3.”

Jenny, 32, and her trainer Trevor Painter, both from Wigan, England, are now using this genetic data to improve her chances of winning gold at the Commonwealth Games and European Championships in four months time.
Jenny added: “This DNAFit test has been a revelation. I only wish I’d had this information years ago. To get to the top as an athlete, it takes a combination of hard work, luck and timing. But if I’d have known what my genetic strengths and weaknesses I could have trained more effectively.

“I was a bit sceptical when I took the test but thought the insights were remarkably spot on. Knowing that my power and endurance potential was evenly split gave an indication that I seemed to have found my ideal distance at 800m.

“I always felt that I could recover quite quickly from training sessions which is exactly what the test predicted. But the real eye opener has been the prediction that I have a high risk of potential sports injury. This is the biggest fear for any athlete wanting to excel at their sport.

“I was heartbroken when I missed competing in my home Olympics because of the achilles injury, which was caused by soft tissue damage on my bursar sack. If I’d have known that I had a higher risk we could have altered my full-on training and maybe things might have been different.

“But now I have this data, Trevor and I have altered my training schedule to reflect it. Instead of doing 14 run sessions a week we’ve reduced it to 11 and replaced them with 3 cardio sessions on the bike. I now do a lot more physio and sports massage sessions.

“I’ve also reduced the recovery time between my set of 10 x 400m runs from 90 seconds to 60 and my times remained the same. Some other runners I trained with cut their recovery time by the same amount but their times dropped significantly.”

A stress fracture of the femur blighted Jenny’s 2013 outdoor season and her focus turned to 2014 and the Commonwealth Games. Since altering her training schedule to reflect the DNA results, she has returned to winning ways. In Prague last month, Jenny clocked a season’s best of 2:01.67 to win the women’s 800m from Czech runner Lenka Masná and Russia’s Yekaterina Poistogova, proving that she is returning to her best. The time has now put her in the top six best current runners in the world.

Jenny added: “Missing out on London 2012 has made me even more determined to go for gold at Glasgow in the Commonwealth Games and the European Championships. Thanks to DNAFit, I feel I have a great opportunity to be at my very best. I really believe that genetic testing is going to revolutionise the world of sport by helping everyone reach their full potential.”

Her trainer Trevor Painter added: “Jenny only made the decision to move from 400m to 800m when she was 24. If we’d have known that she was equally balanced between power and endurance, she could have made that decision a lot earlier. Knowing she had a higher than average risk of sports injury would have led us to ease off on heavy training in the run-up to London 2012 and maybe she would be an Olympic champion now.

“But having the DNAFit data is really helping Jenny get back to her best and maximise her performance. We’re convinced this is going to help so many professional sportsmen and women to train more effectively to reach their goals. It takes away years of trial-and-error guess work to determine which training works.”

A simple mouth swab collects the DNA that is then sent away for analysis by DNAFit to its laboratories in Norwich. The results present an in-depth picture to allow an individual’s genetic profile to be used as a powerful parameter to further define optimal training methods, power/endurance predisposition, potential injury risk and recovery speed. From the DNAFit test it is also possible to learn about an individual’s optimal nutrition and diet plan based on their genetics.
There is currently great momentum behind the role of genetics in sporting performance, with David Epstein’s book “The Sports Gene” recently becoming a New York Times bestseller. Sport science is using DNA testing to reveal key individual genetic characteristics in the quest for ever-improving performance and injury reduction.

Uzbekistan announced last month that next year it will launch a programme run by Rustam Muhamedov, director of the genetics laboratory at the country’s Institute of Bio-organic Chemistry, to test children as young as 10 to help identify the right training programming to help their sporting development.

And DNAFit can reveal today that it is working with Manchester University to test and improve the performance of 80 young sportsmen and women in a controlled scientific study, run by elite athletes strength and conditioning coach Nicholas Jones.

DNAFit is already working with elite professional sportspeople and premier professional football teams to maximise their performance and improve their conditioning through this ground-breaking gene analysis.

Its tests are DNAFit Fitness and DNAFit Diet, which can predict whether a person would best lose weight with a low fat, low carb or Mediterranean diet. The tests are available to the public from £99 at dnafit.com.

Ends

Notes to Editors

For further details, interviews and pictures please contact Jen Roberts by email jen.roberts@commucan.com or telephone 020 7257 9560 or 07713 395507 or 07974 089006

The photocall will take place at the Manchester Regional Arena Indoor Athletics Hall, Sportcity, Rowsley Street, at midday on Monday March 17. Camera crews are invited at 11.30am to set up.

Jenny Meadows will be available for interview, photos and filming at an indoor athletics track in Manchester along with young athletes who are using the test in a university trial. We will also have her DNA report, infographics and journalists will also be able to take the same DNA test.

We will have DNAFit’s Chief Scientific Officer Keith Grimaldi available to explain the science behind the test via Skype or phone and DNAFit consultant and Team GB Olympic 400m runner Andrew Steele who can give an athlete’s perspective.

About DNAFit Life Sciences Limited

DNAFit is the flagship product of DNAFit Life Sciences Limited.

DNAFit Life Sciences Limited was set up by Avi Lasarow, a South African entrepreneur, with a successful track record of launching and running a number of companies in the health sector.

Avi commercialised the world’s first Hair Alcohol Test with his company Trimega Laboratories; rolled out the first roadside drug testing project in South Africa; was engaged by the Attorney General and the Head of Civil Aviation of Libya to identify victims of the 2010 Libya Afriqiyah Airways flight disaster through DNA analysis and he is working on projects such as a test for foetal alcohol
syndrome in new born babies and testing for ARV compliance amongst HIV sufferers in developing countries.

Avi, who is one of South Africa’s leading international entrepreneurs, has been appointed Honorary Consul for the Republic of South Africa to the Midlands region of the UK.

### The DNAPFit test and Jenny’s results

The DNAPFit Fitness test analyses 18 gene variants tied to fitness and recovery. 13 genes linked to an individual’s power/endurance profile and VO2 max potential and 7 linked to post-exercise recovery and injury risk (two gene variants appear in both sections).

Below are the description of the genes and Jenny Meadows’ result.

#### Genes linked to an individual’s power/endurance profile and VO2 max potential

**ACE** (rs4646994)
- Long name: Angiotensin Converting Enzyme
- Associated with: Controlling blood pressure and the fluid (water)/sodium balance in blood.
- This is the most researched gene in relation to sporting performance.
- Sports Connection: **Power and Endurance** (depending on gene configuration).
- **Jenny’s result = ID.** Mixture of power and endurance-based training recommended.

**ADRB2** (rs1042713)
- Long name: Beta 2 Adrenergic Receptor
- Associated with: Regulation of adrenalin release and the control within the central nervous system. Also involved in mobilisation of the carbohydrate, fat and protein in cells for fuel during exercise.
- Sports Connection: **Endurance**
- **Jenny’s result = GG.** Lower VO2 max capacity. Likely to be less responsive to endurance training, although she may have a slightly quicker recovery from exercise.

**AGT** (rs699)
- Long name: Angiotensinogen
- Associated with: Vasoconstriction and blood pressure control
- Sports Connection: **Power**
- **Jenny’s result = CT.** Associated with power, strength and speed sports. A power-based combination and susceptibility to high blood pressure and left ventricular hypertrophy

**ACTN3** (rs1815739)
- Long name: Alpha Actinin 3
- Associated with: Major structural component of the fast twitch fibres of skeletal muscles. Only present in fast twitch muscle fibres.
- Sports Connection: **Power/ Endurance**
- **Jenny’s result = CT.** Expected to be good at strength, speed and power activities. Advantage for sprint and power profile, OK for endurance

**BDKRB2** (+9/-9 INDEL)
- Long name: Bradykinin Receptor B2
- Associated with: Vasodilation and blood pressure control. Efficiency of muscular contraction and cell hydration.
- Sports Connection: **Endurance**
- **Jenny’s result = TT.** Associated with endurance. Contributes to positive response to endurance training. Positive for increased muscle efficiency especially in conjunction with ACE I-allele. This genotype is more frequent in endurance athletes
CRP (rs1205)
Long name: C-Reactive Protein
Associated with: An acute phase protein which rises in response to inflammation in the body.
High CRP is assoc with low VO2MAX. Diet and physical activity can reduce CRP levels (although intense exercise can cause short term local increases in CRP).
Sports Connection: **Endurance / VO2max**
*Jenny's result = GA.* Exercise positive for VO2 max / Endurance profile. Intermediate CRP levels and some benefits in VO2max response to training

IL-6 (rs1800795)
Long name: Interleukin-6 - a proinflammatory cytokine
Associated with: Stimulates the immune response to training and is involved in the inflammatory repair process.
Sports Connection: **Power**
*Jenny's result = GG.* Associated with lower levels of inflammation after hard training sessions, leading to quicker recovery times. This genotype has been independently associated with performance in power sports.

NRF-2 (rs7181866)
Long name: Nuclear Respiratory Factor 2
Associated with: Improving respiratory capacity and energy mobilisation in cells
Sports Connection: **Endurance**
*Jenny's result = AA.* Not associated with improved endurance training.

PPARA (rs4253778)
Long name: Peroxisome Proliferator-Activated Receptor Alpha
Regulates genes responsible for skeletal and heart muscle fatty acid oxidation and is a main regulator of energy metabolism
Sports Connection: **Endurance**
*Jenny's result = GG.* Associated with endurance. G allele is associated with endurance sports. May have higher levels of slow twitch muscle fibres. These carriers may increase fatty acid mobilisation with training.

PPARGC1A (rs8192678)
Long name: Peroxisome Proliferator-Activated Receptor Gamma Coactivator-1
Associated with: Regulation of energy homeostasis, including production of mitochondria, fat and carbohydrate burning and conversion of muscle fibres to slow twitch type.
Sports Connection: **Endurance**
*Jenny's result = GG.* Contributes to positive responses to endurance training and activity

TRHR (rs16892496)
Long name: Thyrotrophin Releasing Hormone Receptor
Associated with: Regulating of the metabolic rate, mobilising fuels during exercise and also growth of lean body tissue.
Sports Connection: **Power**
*Jenny's result = TT.* No measured impact on fitness. More likely to achieve favourable improvements in lean body mass and muscle growth with strength training programmes.

VEGF (rs2010963)
Long name: Vascular Endothelial Growth Factor
Associated with: New blood vessel growth to support exercise activities. Regular exercise and progressive training programmes can create a 4-fold increase in levels of VEGF.
Sports Connection: **Endurance**
*Jenny's result – CG.* An endurance-based combination with good muscular efficiency
VDR (rs731236)
Long name: Vitamin D Receptor (Taq 1)
Associated with: Vitamin D3 levels in the blood – Vitamin D3 is involved in maintaining appropriate calcium and phosphorous levels in the blood and providing immune support.
Sports Connection: **Power**
**Jenny's result = CC.** Better strength gain, muscle growth. Carriers may achieve favourable muscle growth and bone density with strength training programmes. Studies have associated this genotype with higher glucose levels in sedentary individuals – exercise was shown to normalise this.

### Genes linked to post exercise recovery & injury risk

**CRP (rs1205)**
Long name: C-Reactive Protein
Associated with: An acute phase protein which rises in response to inflammation in the body. It is stimulated by IL-6 and is often used as a marker for inflammation in blood tests.
**Jenny's result = GA.** Regular exercise has positive impact on recovery. May experience moderately increased levels of inflammation after strenuous exercise. A longer rest period between training sessions may be required compared to AA.

**IL-6 (rs1800795)**
Long name: Interleukin-6 - a pro-inflammatory cytokine
Associated with: Stimulates the immune response to training and is involved in the inflammatory repair process
**Jenny's result = GG.** Associated with lower levels of inflammation after hard training sessions, leading to quicker recovery times.

**IL6R (rs2228145)**
Long name: Interleukin-6 receptor
Associated with: Regulating cell growth and differentiation and plays an important role in immune response
**Jenny's result = AC.** Associated with intermediate fatigue and longer recovery times

**SOD2 (rs1800629)**
Long name: Super Oxide Dismutase 2
Associated with: Scavenging of free radicals in the cells, especially within the mitochondria. It is therefore an antioxidant protector of cellular health
**Jenny's result = TC.** Associated with moderately reduced levels of antioxidant protection during hard training sessions. A longer rest period between training sessions may be required

**TNF (rs1800012)**
Long name: Tumour Necrosis Factor
Associated with: Regulation of immune cells; able to induce fever, inhibit tumour growth and viral replication and is involved in inflammation.
**Jenny's result = GG.** Associated with lower levels of inflammation after hard training sessions, leading to quicker recovery times.

**COL1A1 (rs12722)**
Long name: Collagen 1 Alpha 1
Associated with: Type 1 Collagen, the main collagen found in connective tissues, including tendons, ligaments and cartilage.
**Jenny's result = GG.** May be more prone to ligament injury. Increased risk of tendon and ligament injuries in sport. Undertake prehabilitative exercises relevant to the sport and consider nutritional support for connective tissue.
**GDF (rs1800629)**
Long name: Growth Differentiation Factor 5, a bone morphogenetic protein involved in joint formation. Associated with: Central Nervous System expression and the healing of skeletal, joint and soft tissues.

**Jenny's result = CT.** Moderately raised risk of tendinopathy and osteoarthritis. Undertake prehabilitative exercises relevant to the sport and consider nutritional support for connective tissue.

**About Jenny Meadows**

Jenny Meadows has been involved in athletics for over 20 years, joining her local athletics club when she was 7. As a school athlete she enjoyed early successes winning the English Schools and AAA's National titles at 800m.

In her junior years she moved to the 400m, again gaining national titles and in 2000, in Santiago, Chile, as part of the 4x400m relay team was crowned "World Junior Champion".

She's been a regular in the Great Britain and N.I Team since 2002, reverting back to the 800m in 2005 and in 2008 won the European Cup and was part of Team GB at the Beijing Olympic Games.

In 2009 she won the bronze medal in the 800m at the World Championships in Berlin and in 2010 broke the British indoor 800m record on two occasions and won silver at the World Indoor Championships in Doha as Captain of the Great Britain team.

In the same year at the European Championships she won the bronze medal.

In 2011, Jenny won gold and silver medals at the European Indoor Championships for the 800m and the 4x400m relay and became the 800m National Outdoor Champion.

Devastatingly, an achilles injury picked up at the start of 2012 was to render Jenny unable to compete for the year and consequently ended her hopes of running at her home Olympic Games where she was a favourite to collect another medal.

Jenny made a competitive return to the track and was awarded the Captaincy of the Great Britain team at the European Indoor Championships in Gothenburg. A stress fracture of the femur blighted Jenny's 2013 outdoor season and her focus turned to 2014 and the Commonwealth Games.

In Prague last month, the 2011 European indoor champion clocked a season's best of 2:01.67 to win the women's 800m, proving that she is returning to her best following illness and injury setbacks.