

# Big Wheel Keep On Turning!



**15** ~~14~~ Published Human Clinicals & Counting!

**LJ100<sup>®</sup>** The World's Best Adaptogen™ • [www.LJ100.com](http://www.LJ100.com)



**Turning Back  
The Hands  
of Time!**

**LJ100<sup>®</sup>** The World's Best Adaptogen™

## Turn Back the Clock, Turn Back the Wheel...

*If you look at successful natural ingredients – those that have a long history of use and that also have modern sophisticated clinical research – they serve as hubs of a wheel, and their uses as shown by the science are the spokes.*

*Take LJ100® Tongkat Ali (TA), also known as Eurycoma longifolia. This botanical is a sturdy hub with many actions springing forth allowing for a complete circle of fluid movement.*

*Turn back the clock, turn back the wheel with LJ100®, the world's best adaptogen.*



## LJ100<sup>®</sup> – The Hub

LJ100<sup>®</sup> is the result of an innovative collaboration between the esteemed MIT and the Government of Malaysia. The latter has invested considerable funds and efforts to license, develop and sustain research into the potential benefits of Tongkat Ali through a variety of governmental organizations, various universities, the Ministry of Science, the Malaysian Sovereign Wealth Fund and the Forest Research Institute of Malaysia.

The patent (dated November 7, 2006, number 7,132,117 [US] and WO 02/17946 A1 [worldwide]) is for the ***“Bioactive Eurypeptides isolated in Tongkat Ali that are proven to be the active compounds effective for treatment of sexual dysfunction, male infertility, and increased testosterone.”***

The patent describes 16 claims ranging from composition and how such aqueous extracts of Tongkat Ali positively increase androgen biosynthesis and influence reproductive capabilities in men.



**Tongkat Ali Root**  
*Eurycoma longifolia*



*Eurycoma longifolia* growing  
in Malaysia rainforest

## What Is Tongkat Ali?

Malaysia has a rich source of rainforests that contain thousands of plants with potential medicinal values. One such plant is the tall shrub tree from the Simaroubaceae family, *Eurycoma longifolia*, which is commonly found in the lush rain forests of Malaysia. The local name of the shrub is Tongkat Ali, which translates to "Ali's Walking Stick," a rather suggestive reflection of its traditional function and that is to provide virility for aging males.

Tongkat Ali's medicinal elements are contained in the roots, a large, elaborate and visually stunning network that resembles wood. The roots of Tongkat Ali were used as a decoction by the natives of old Malaya, especially the elderly, for strength and energy, as well as to boost libido and sexual virility in aging men. Modern phytochemistry has further clarified that the roots contain eurypeptides, a 30–39 amino-acid chain, and a 4,300 dalton molecular weight.

In general, condition-specific product applications for **LJ100**<sup>®</sup> include: supports libido and sexual function, supports physical and mental energy, supports hormonal balance (notably cortisol/testosterone ratios), enhances sports performance, enhances healthy weight management/fat loss, and increases free testosterone as a safe alternative to testosterone replacement therapy.

Recent clinical studies have shown additional benefits, immune sustenance, healthy inflammatory management, healthy bone remodeling, and healthy blood sugar balance.



# LJ100<sup>®</sup>

## About LJ100®

**LJ100®** is made from wild-crafted Tongkat Ali root from the rainforests of Malaysia utilizing sustainable harvesting and fair-trade practices. **LJ100®** is produced using a patented extraction technology with high temperature, high pressure and ultra-filtration, and is standardized to 40% glyco saponins and >22% eurypeptides; Tongkat Ali roots from elsewhere likely do not contain these phytochemicals to those percentages.



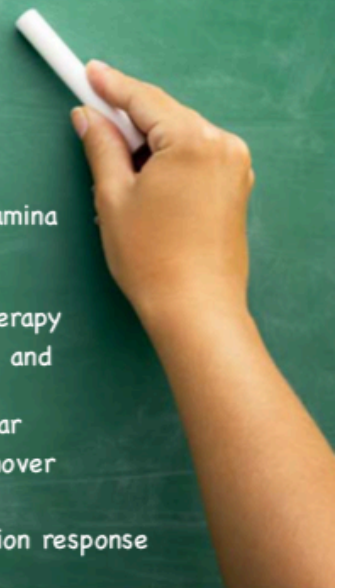
In its raw form, Tongkat Ali by itself has a distinctively bitter taste. This characteristic is a result of its standardized hot-water extraction process, which allows for the retention of quassinoids, one of the bitterest phytochemicals in nature that also have applications in promoting human health. Tongkat Ali extracts that do not taste bitter are either not authentic Tongkat Ali root (there are many commercial examples of “fake” Tongkat Ali extracts) or are sub-potent in terms of bioactive constituents, and thus will be expected to have low efficacy.

Numerous commercial Tongkat Ali ingredients claim “extract ratios” from 20:1 to 400:1 without any information about bioactive constituents, extraction methodology (e.g., ethanol versus water) or extract purity. Alcohol extraction of *Eurycoma longifolia* has been studied in mice for antimalarial effects of concentrated eurycomalactone, which has highly toxic effects at high doses and would preclude safe use in humans as a long-term dietary supplement. Further, alcohol extraction leaves ratios and profiles that do not quite measure up to the exacting standardizations of **LJ100®** –its hot-water root extract standardized for known bioactive compounds (0.8% eurycomanone, 22% eurypeptides, 30% polysaccharides, 40% glyco saponins) have been demonstrated to be extremely safe at high doses for long-term consumption. Further, **LJ100®** is completely safe for men and women.

## 15 Benefits of LJ100®

LJ100® is the only Tongkat Ali ingredient that has the following clinically proven benefits:

- Enhances sexual function and increases libido
- Maintains normal high free testosterone levels
- Inhibits sex hormone binding globulin
- Reduces cortisol, the stress hormone
- Improves various mood profiles
- Prevents dieters from binge eating to achieve successful weight loss
- Promotes anabolic state and reduces catabolic state
- Reduces fatigue and tension
- Improves endurance and stamina for athletes of all ages
- Natural alternatives to testosterone replacement therapy
- Promotes overall well-being and hormonal health
- Supports healthy blood sugar
- Supports healthy bone turnover
- Promotes immune function
- Manages healthy inflammation response



## Spoke 1: Free Testosterone

Some hormones have one or two actions or responsibilities. But testosterone has many, and when testosterone (free testosterone or FT) is being produced at healthy levels, men (and women) feel energized and sleep better. They have easier times maintaining lean body mass and lowered fat, normal mood ranges, and enjoy the romantic spontaneity from an energized libido.

Conversely, aging lowers the body's ability to continue to produce free testosterone at the rapid clip it did in the late teens and 20s. And as such, the belly fat creeps in, the muscles lose strength and density, and essentially the "get up and go," as Aerosmith famously sang, "got up and went."

When we are energized in all senses, we can feel physically fit and enjoy mental acuity and even mood. We delight in a healthy sex life. And we feel good. Consider all those benefits as the spokes in a wheel – and testosterone is the hub from which the spokes spring.

Researchers Tambi and Saad (2005), asserted, "Testosterone stimulates metabolism, which promotes fat burning, and accelerates muscle growth. Testosterone helps to build protein and is essential for normal sexual behavior and producing erections.

It also affects many metabolic activities such as production of blood cells in the bone marrow, bone formation, lipid metabolism, carbohydrate metabolism, liver function and prostate gland growth."<sup>1</sup>

One study of significance (published in three journals, 2005, 2006 and 2007) focused on the outcomes of a proprietary and patented Tongkat Ali extract, **LJ100**<sup>®</sup>, on various parameters in 20 male volunteers with varied health conditions and aged between 38 and 58.<sup>2,3,4</sup> The volunteers were randomly given either a placebo or **LJ100**<sup>®</sup> in doses of 200, 400 or 600 mg for two months.

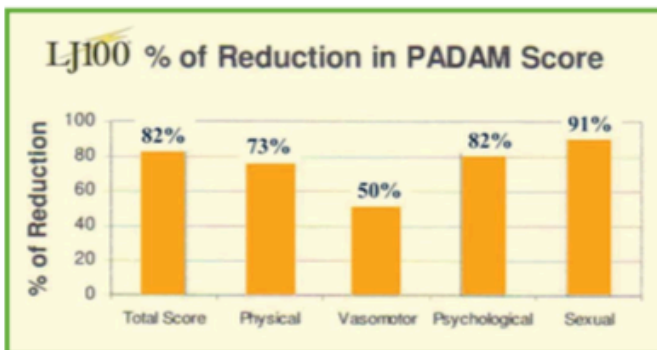
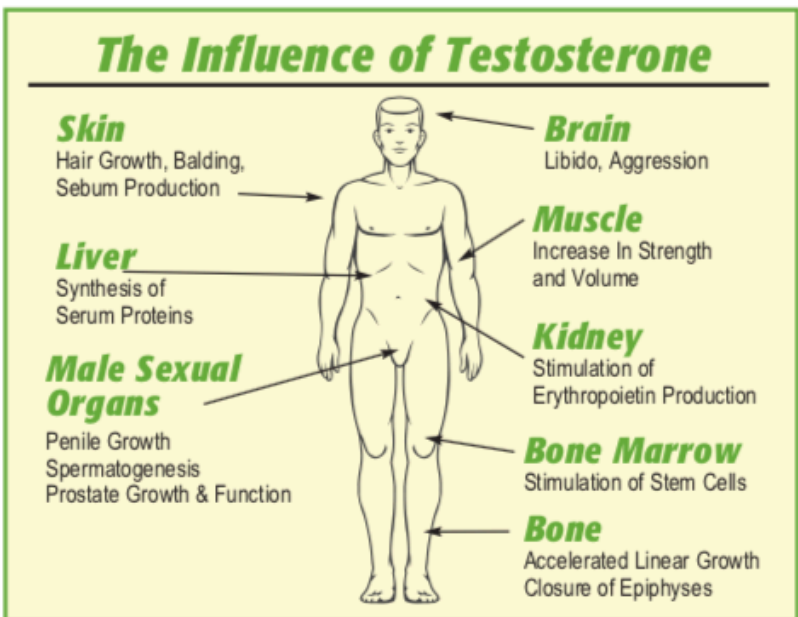
### **The Study Yielded The Following Compelling Data Points:**

- **The majority of volunteers showed improvement in Sexual Health Inventory for Men, improvement in sexual desires and performance.**
- **Aging Males' Scores improved in the LJ100<sup>®</sup> group compared to placebo, showing improvement in sexual, physical, psychology and vasomotor domain.**
- **Testosterone and DHEA levels were high normal levels when compared to baseline.**
- **HDL cholesterol improved.**
- **Volunteers who had type-2 diabetes showed improvement in blood glucose levels.**
- **The LJ100<sup>®</sup> group had high normal levels of insulin-like growth factors (IGF-1); lower levels of IGF-1 are correlated with higher body fat.**
- **The majority of volunteers on LJ100<sup>®</sup> had high normal level of thyroxin compared to placebo, meaning higher metabolism rate.**
- **Profiles of vital body functions: blood profile, lipid profile (including triglycerides and cholesterol), liver function, renal function, electrolytes, various tumor markers including PSA (which when in high numbers potentially signify benign prostatic hyperplasia or enlarged prostate, or even presence of prostate cancer) were all within normal range.**



**The benefits of maintaining or restoring youthful testosterone levels provide an upward spiral.**

*The more lean mass is gained, fat is lost through the ability to exercise at higher levels. This results in a healthier muscle-to-fat ratio, which allows for lowered blood pressure, favorable cholesterol and triglyceride levels, healthier insulin/blood sugar levels, more energy, and increased health and well-being.*



A three-week study of 30 men aged 31–52, who took either a placebo or 100 mg of **LJ100**<sup>®</sup>, showed a 91% improvement in physical component, 82% improvement in psychological component and 50% improvement in vasomotor score.<sup>5</sup>

Partial Androgen Deficiency In Aging Men (PADAM) scores improved by 82%, suggesting physical, vasomotor, psychological and sexual wellbeing. DHEA increased from 26% to 47%, and Sex Hormone Binding Globulin (SHBG) decreased 30% in subjects. Consequently, free testosterone levels increased from 39% to 73% in the **LJ100**<sup>®</sup> group.<sup>5</sup>

## Spoke 2: Promotes Sexual Virility

Men, who are otherwise healthy and who begin to have problems attaining a satisfactory and quickly produced erection, are frequently prescribed medications that treat the condition, erectile dysfunction. These popular medications are known as cGMP-specific phosphodiesterase type 5 (PDE5) inhibitors, which regulate blood flow to the penis, allowing it to grow into a healthy erection. These medications include tadalafil (Cialis®), sildenafil (Viagra®) and vardenafil.

Side effects for some moments of pleasure, however, can be severe at worst, and very discomforting at best. For example, according to drugs.com, the more common side effects of Cialis are "acid or sour stomach, belching, heartburn, indigestion and stomach discomfort." Those who take Viagra may have common side effects such as diarrhea, flushing, headache, labored breathing and muscle pain/aches, among others.

But, it does not have to be that way. Men who begin to experience impotence and related sexual performance issues first need to consult with their physicians to discount atherosclerosis (which by its nature restricts blood flow to the penis), as well as other health conditions.

*And then, adding LJ100® daily should help dramatically!*

In a 2002 study presented at the First Asian Andrology Forum in Shanghai, China, 30 male patients in healthy relationships took either 100 mg of LJ100® or a placebo for three weeks; during this time, they filled out the Sexual Health Inventory Questionnaire (SHIQ). At the end of the study, the SHIQ showed a 62% increase in scores, demonstrating increased sexual desire and sexual attempts..

In a randomized, double-blind, placebo-controlled, parallel group study, 109 healthy men aged 30 to 55 took either 300 mg of LJ100® or a placebo for 12 weeks. At the study's end, researchers found that the LJ100® group had had significant improvement in Quality of Life score.

The SF-36 Questionnaire is showing significant improvement in Physical Function & Vitality Domain. The International Index of Erectile Function (IIEF) score also showed significant improvement in sexual satisfaction and erectile function. In addition, libido is significantly increased by 14%, and SHBG was significantly lower in the LJ100® group.

# LJ100®



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In another study 26 men with mild erectile dysfunction were given either 200 mg of **LJ100**<sup>®</sup> or a placebo daily for 12 weeks. The **LJ100**<sup>®</sup> group demonstrated statistically significant higher scores than the placebo group in the following endpoints: Erection Hardness Scale score

improved by 39%, Aging Males' Symptoms (AMS) scores improved 24%, and the Sexual Health Inventory for Men improved 26%.<sup>7</sup> AMS is a valuable tool used worldwide for assessing health-related quality of life in aging men.

Effect of LJ100 <sup>®</sup> on 26 Men with Mild Erectile Dysfunction			
Endpoints	Baseline	12 weeks	% Change
Testosterone	359.23 ± 27.09	396.46 ± 47.26	+10.4%
Erection Hardness Scale (EHS)	2.54±0.22	3.54±0.11	+39%
Sexual Health Inventory for Men (SHIM)	15.77±1.32	19.85±1.21	+26%
Aging Males' Symptoms (AMS) scale	25.85±2.02	20.85±1.10	+24%

Effect of LJ100 <sup>®</sup> on 26 Men with Mild Erectile Dysfunction			
SIA Questions	Baseline	12 weeks	% Change
Were you able to insert your entire penile shaft into your partner's vagina?	0.71±0.11	0.96± 0.02	+35%
Did your erection last long enough for you to have successful intercourse?	0.44±0.12	0.89±0.04	+102%
Elapsed time from erection perceived hard enough for penetration to withdrawal from your partner's vagina (in minutes)?	7.47±2.06	19.56±3.93	+162%
Overall, were you satisfied with the hardness of your erection?	0.28±0.11	0.70±0.09	+150%
Overall, were you satisfied with this sexual experience?	0.33±0.10	0.87±0.06	+164%
Please rate the range of your erection during this sexual intercourse attempt.	2.54 ± 0.22	3.54±0.11	+39%

The improvements in these sexual factors strongly suggest that the addition of **LJ100**<sup>®</sup> as a daily dietary supplement may significantly improve not only sexual performance,

but also sexual satisfaction; the latter, when achieved, tends to also elevate quality of life.

A key role in sexual wellbeing is played by the activity of pheromones, which are compounds that transmit signals between organisms of the same species. Human pheromones are thought to be transmitted in sexual attraction.

Pregnenolone is a pre-cursor to an- $\alpha$ , a pheromone responsible for human sexual communication, psychology and behavior.

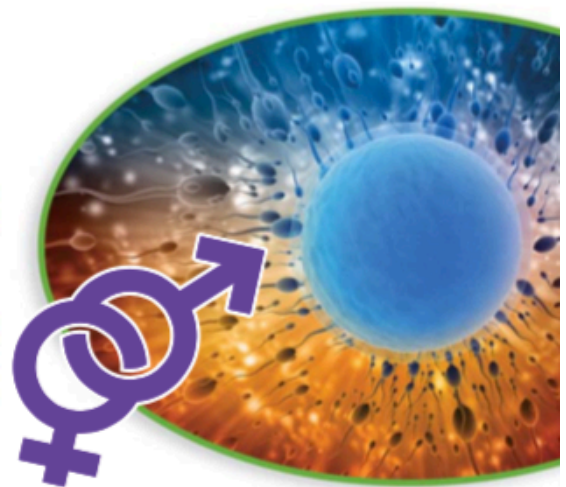
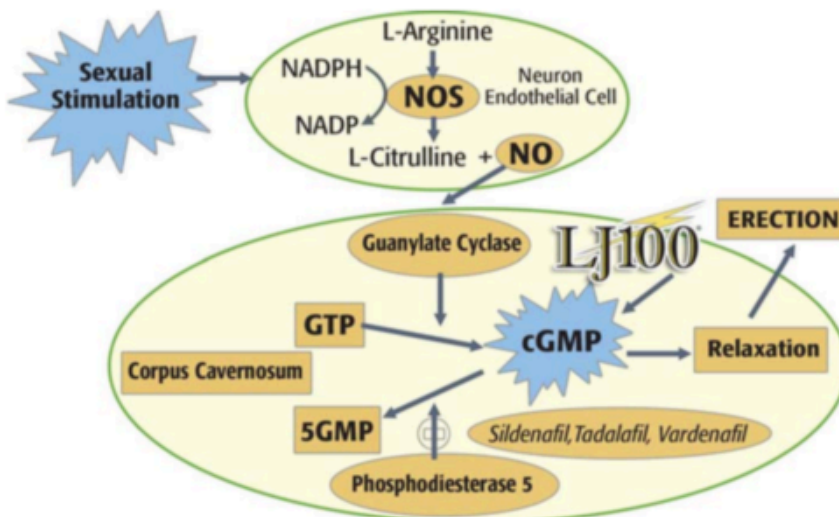
MIT research showed that **LJ100**<sup>®</sup> actively converts pregnenolone into an- $\alpha$  pheromone suggesting that **LJ100**<sup>®</sup> supplementation may enhance sexual attraction and, therefore, increase desire and improved libido.<sup>9</sup>

Increased libido increases the opportunity for better erections. **LJ100**<sup>®</sup> has been shown to have a similar action to sildenafil (popularized as Viagra), but without the side effects.

	Control	LJ100 <sup>®</sup> (2)	LJ100 <sup>®</sup> (3)
An $\alpha$	32.70	109.99	207.26
Pregnenolone	5.15	1.41	1.31

Penile erection is a neurovascular event modulated by psychological factors and hormonal status. On sexual stimulation, nerve impulses cause the release of neurotransmitters nitric oxides (NOs) which activate

guanylate cyclase. This increases cyclic guanosine monophosphate (cGMP), which causes the relaxation of tubercular smooth muscles in corpus cavernosa followed by penile erection.



In an unpublished in vitro study, rabbit corpus cavernosum tissues were treated with various concentration of **LJ100**<sup>®</sup> or sildenafil citrate. cGMP and cAMP level were measured using an enzyme-linked immunoassay (EIA) kit. Sodium nitroprusside (SNP) were used as a stimulus for nitric oxide formation. In the presence of SNP (10  $\mu$ m) **LJ100**<sup>®</sup> increased cGMP in rabbit corpus cavernosum by four

fold (5.298pM/mg tissue), similar to sildenafil citrate (4.832pM/mg tissue), compared to control (1.2pM/mg tissue). In addition, **LJ100**<sup>®</sup> increases cAMP levels in corpus cavernosum while there were no significant increases with sildenafil citrate. The erectogenic effect of **LJ100**<sup>®</sup> maybe similar to sildenafil citrate.

## Spoke 3: Fitness and Athletic Enhancement

As men and women enter middle age, the “battle of the bulge” becomes serious, and muscle mass seems harder to attain and sustain. In other words, one must work much harder than ever to remain trim, fit, strong and agile.

Supplements such as protein powders and fat burners seem to be top of mind, however they do not address the underlying problem. But, **LJ100**<sup>®</sup> does. Studies on humans show that **LJ100**<sup>®</sup> supplementation aids in creating a favorable anabolic state (building up of muscle as a result of free testosterone), while suppressing a catabolic state (breaking down as a result of increased cortisol); this enhances performance. In tandem, **LJ100**<sup>®</sup> supplementation has been shown to increase fat free mass and decrease body fat, and increase muscle strength and size as well as endurance.

These desired benefits appear to stem from **LJ100**<sup>®</sup>'s ability to encourage endogenous testosterone production. In one study, nine men (between ages 24 and 52) were consuming 100 mg of **LJ100**<sup>®</sup> in the morning and evening for 10 days;

saliva testosterone was measured at the beginning and the conclusion of this regimen.<sup>11</sup>

This test reveals several compelling observations. One is that the youngest volunteers had a much higher level (measured in nanograms per deciliter or ng/dl) at the beginning than older volunteers: the 24-year-old began with 950 ng/dl, while the 52-year-old began with 450 ng/dl. This gives tremendous demonstrable credence to the concept that men lose testosterone as they age.

The second compelling data set is the increase in testosterone among all nine individuals: the highest was 132.63% while the lowest was a still significant 37.14%. The oldest participant—at 52 years old—had a 70% increase in total testosterone levels. One cannot attribute these changes to increased exercise. In fact, the 52-year-old participant was one of several men that did no exercise at all over the course of the study. Clearly, **LJ100**<sup>®</sup> had an extraordinary impact on encouraging the body to produce higher sustainable testosterone levels.

### Effect of LJ100<sup>®</sup> on Endogenous Testosterone Production in Men After 10 days

Group One (Exercised Regularly)			
Age	Base ng/dl blood	10 days ng/dl blood	Increase
26	860	1,650	91.86%
28	580	985	69.83%
35	875	1,576	80.11%
24	950	2,210	132.63%
29	755	1,345	78.15%

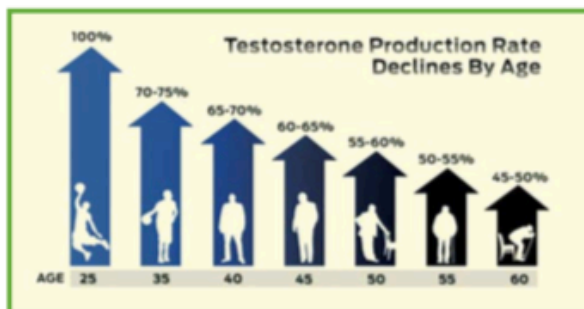
  

Group Two (No Exercise)			
Age	Base ng/dl blood	10 days ng/dl blood	Increase
48	650	875	34.62%
52	450	765	70.00%
50	585	875	49.57%
42	350	480	37.14%

## Spoke 4: Andropause – Men’s Change of Life

“Andropause,” often called “male menopause,” is not a marketing term or a buzzword. It is a highly accurate description of a condition marked and exacerbated by a slow but steady decline in endogenous testosterone production. Low testosterone levels give rise to several quality of life issues: fatigue, reduced muscle bulk/strength, low mood/depression, fewer spontaneous erections, loss of libido, decreased ability to concentrate and increased body fat, to name a few.

The difference between andropause and menopause is that the former is characterized by gradual declines in hormone levels, while in women, hormone levels drop suddenly. Healthy men will usually experience a 1% drop in testosterone every year starting around age 40. Young men typically have testosterone levels of approximately 1,000 ng/dl, while the average level for an 80-year-old man is about 200 ng/dl.



Referring back to the testosterone saliva test in the previous chapter, the starting ng/dl levels of men in various age brackets are about normal. The oldest volunteer, age 52, achieved a 70% increase in testosterone after **LJ100**<sup>®</sup> consumption, peaking at 765 ng/dl at the study’s conclusion.<sup>11</sup>

Researchers George and Henkel explain in their research paper, “Testosterone deficiency syndrome (TDS) is characterized by numerous symptoms, including low libido, increased fat mass, fatigue, erectile dysfunction or osteoporosis, and up to 80% of men will experience

some aging males’ symptoms. This is caused by the age-depending decline in serum testosterone levels with concentrations being about 40–50% lower in men older than 60 years compared with young men.

This significant decline in testosterone levels is further closely linked with medical conditions such as obesity, metabolic syndrome, diabetes or hypertension. The conventional way of treating TDS is testosterone replacement therapy (TRT), for which preparations are on the market. Apart from the beneficial effects of TRT, significant adverse side effects have been described, and prostate cancer (PCa) as absolute contraindication is debated.”<sup>16</sup>

They add that **LJ100**<sup>®</sup> is a “natural alternative to TRT and has been shown to restore serum testosterone levels, thus significantly improving sexual health. This includes significant positive effects on bone health and physical condition of patients.

In addition, a significant antihyperglycemic effect and cytotoxicity against PCa cells has been shown. Thus far, at therapeutic concentrations, no significant side effects of the treatment were obvious. Therefore, TA might be a safe alternative to TRT.”



## Spokes 5,6,7: Weight, Cortisol, Mood & Energy

Weight, mood and energy are strongly intertwined. When an individual begins to lose weight through healthy diet and exercise, almost like magic, both mood and energy tend to improve as well.

However, aging tends to cause weight gain, notably around the belly/trunk, and attempts to lose weight are often fraught with frustration, as the weight and belly fat tend to stick around. In tandem, energy and mood are also affected.

Declining circulating testosterone is a culprit, as are high levels of circulating cortisol, a stress-response hormone. Cortisol is necessary for a fight-or-flight reaction; however, modern lifestyles tend to create a chronic, low-grade stress that releases cortisol, which increases appetite. In other words, stress eating. Additionally, this status creates the tendency to store visceral fat around the trunk. Visceral fat, located deeper within the abdomen, is linked to cardiovascular disease and type-2 diabetes.

It is generally suggested that stress-induced cortisol weight is usually gained around the waistline because fat cells in that area are more sensitive to cortisol.

The fat cells in your abdomen are richer in stress hormone receptors, are particularly sensitive to high insulin, and are very effective at storing energy – more so than fat cells you would find in other areas of the body. This is the most dangerous place to gain weight, as it can lead to metabolic syndrome, diabetes and heart disease.

As mentioned earlier, when one begins to lose weight, there is an upcycle, wherein energy improves as does mood. Newton's First Law of Motion states "a body in motion tends to stay in motion, while a body at rest tends to stay at rest" is relevant here: when one begins to exercise and keeps at it, energy is better sustained, and overall physical activity is increased as fat burns and muscles gain mass and strength.

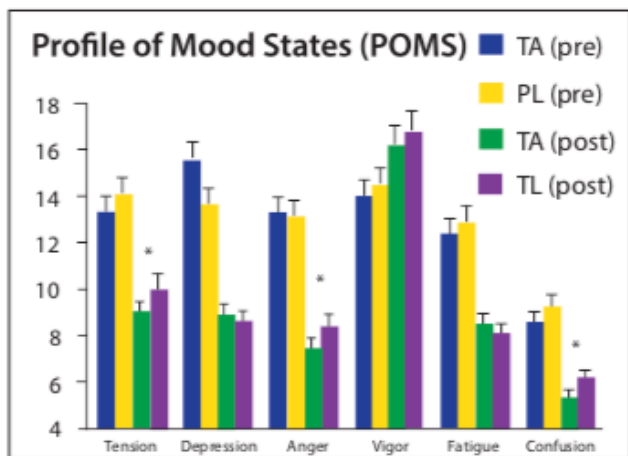


In one 2007 study, 50 moderately overweight men and women were recruited to participate in a six-week program of stress management, nutrition intervention and exercise; 40 were given 50 mg of **LJ100**<sup>®</sup> combined with citrus bioflavonoids (CitruSlim™ provided by HP Ingredients), while 10 were given a placebo. The results were as follows:<sup>19</sup>

- The **LJ100**<sup>®</sup> group showed significant body weight loss—2.7 kg with 87% body fat loss—versus 0.78 kg in body weight loss in the placebo group.
- The cortisol/testosterone ratio decreased significantly by 15% for the **LJ100**<sup>®</sup> group versus a 7% increase in the placebo group, suggesting that **LJ100**<sup>®</sup> may help promote a favorable anabolic state.
- The **LJ100**<sup>®</sup> group showed significant reduction of total cholesterol by 17% and LDL by 15%; there was no change in the placebo group.
- The **LJ100**<sup>®</sup> group showed improvement in global mood profile

These results suggest that supplementation with **LJ100**<sup>®</sup> may help to maintain normal levels of cortisol (low) and testosterone (high) and thus promote an overall "anabolic" hormonal state (versus a "catabolic" state characterized by elevated cortisol and suppressed testosterone). In addition, the higher testosterone level also contributes to higher energy levels and reduced fatigue, and prevents dieters from binge eating.

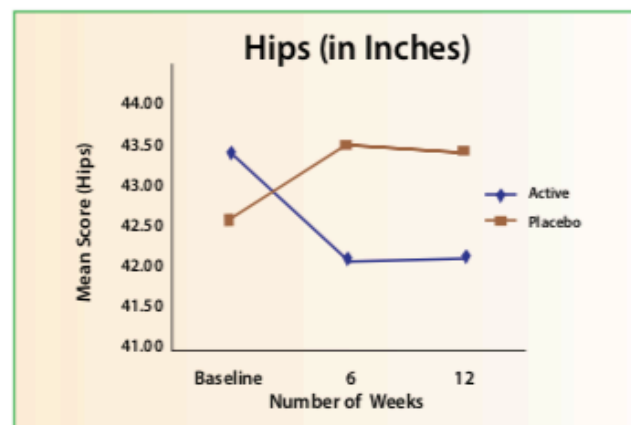
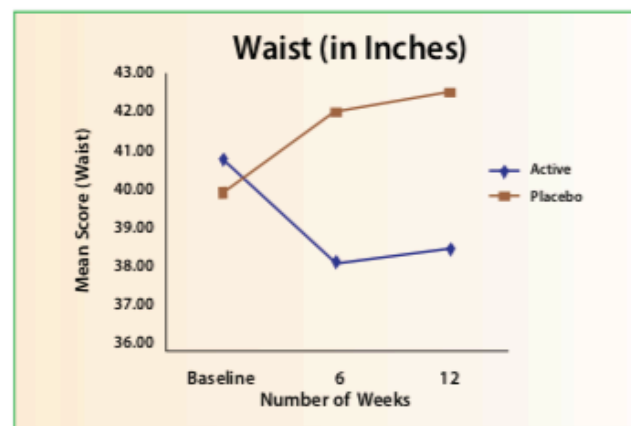
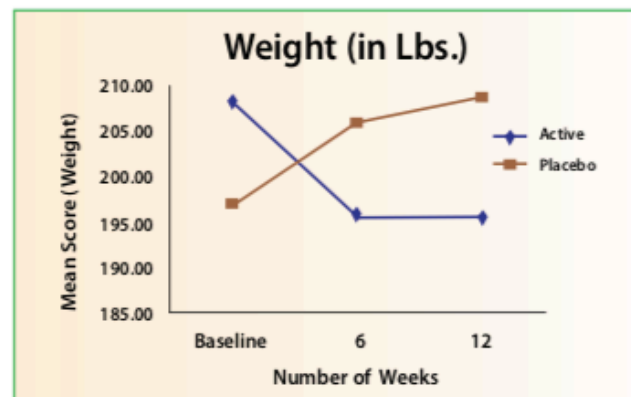
In one study, 32 men and 31 women with moderate stress levels took either 200 mg of **LJ100**<sup>®</sup> per day or a placebo for four weeks (20). The **LJ100**<sup>®</sup> group showed significant improvements in tension (-11%), anger (-12%) and confusion (-15%) compared to placebo. Stress hormone profile (salivary cortisol and testosterone) was significantly improved by **LJ100**<sup>®</sup>, with reduced cortisol (-16%) and increased testosterone (+37%).



The authors concluded that **LJ100**<sup>®</sup> appears to have significant potential for restoring hormone balance (cortisol/testosterone) and improving psychological mood state in humans exposed to various modern stressors, including aging, dieting and exercise stress.<sup>20</sup>

Switching gears to healthy weight management, in a 2014 study, 26 men ages 40–65 took 200 mg day of **LJ100**<sup>®</sup> (n=12) or a placebo (n=14) for 12 weeks (3). The supplemented men experienced numerous sexual health benefits, and they also experienced noteworthy benefits related to healthy weight management.

While the men in the placebo group gained weight over the course of the study, the **LJ100**<sup>®</sup> group lost weight. In addition, hip and waist measurements were lower at the end of the study with the active group.





## ***Spoke 9: Healthy Inflammatory Management***

The anti-inflammatory effect of **LJ100**<sup>®</sup> was investigated in a carrageenan-induced paw edema in mice. **LJ100**<sup>®</sup> showed an anti-inflammatory effect in a dose dependent manner and comparable to that of diclofenac. **LJ100**<sup>®</sup> also showed analgesic effects in the acetic acid test in a dose-dependent manner.<sup>22</sup>

The analgesic activity of 400 mg/kg **LJ100**<sup>®</sup> was higher than that of aspirin in the hot plate test. The mechanism of action was evaluated in an in vitro molecular study using macrophage cells (RAW 264.7 cells).

**LJ100**<sup>®</sup> suppressed NF- kappa B translocation to the nucleus, leading to inactivation of the NF- kappa B signaling pathway and consequently reducing the expression of cyclooxygenase-2 and inducible nitric oxide synthase.

These two enzymes are responsible for inflammation and pain. These results exhibited the beneficial effects of **LJ100**<sup>®</sup> for alleviating pain and inflammation, which were exerted through inactivation of the NF-kappa B signaling pathway.<sup>22</sup>

## Spoke 11: Healthy Blood Sugar

Elevated blood glucose is spurred by absolute or relative lack of insulin or insulin insensitivity, and these have been the target for therapy when blood glucose numbers are high. The liver, muscle and adipose tissues are insulin-sensitive tissue that can store glucose in the body, the supply of which can be influenced by intestinal glucose absorption. These organs in conjunction with insulin secreted from the pancreas determine the level of glycemia. In diabetes, insulin lack or insensitivity disrupts the balance maintained by these organs, with net elevated blood glucose.

The potential antidiabetic mechanism involved in the glucose-lowering effects of **LJ100**<sup>®</sup> extract and peptide were recently investigated in cell cultures of BRIN-BD-11 (pancreatic), 3T3-L1 (pre-adipocyte-fat cells), Caco-2 (intestinal) and L6 (myocyte-muscle cells) cells (Imam et al., 2017). Glucose uptake was investigated in the three cells and insulin secretion was investigated in of BRIN-BD-11 (pancreatic) cells. Glucose uptake was un-regulated in 3T3-L1 (pre-adipocyte-fat cells), Caco-2

(intestinal) and L6 (myocyte-muscle cells) cells, thus potentially reducing serum glucose and glycaemia.

The increased uptake of glucose in muscle cells may explain the energy boosting effects of **LJ100**<sup>®</sup> particularly as it has been reported in another study to increase cAMP levels thus enhancing glucose metabolism. As glucose is needed to sustain short term and physical performance, athletes taking **LJ100**<sup>®</sup> may therefore perform better with the increased glucose in muscle cells for energy.

Glucose absorption via intestinal cells (Caco-2) was minimal, suggesting glucose uptake is mainly by its ability to enhance insulin secretion, and potentiate glucose uptake into muscle and adipose cells through the presence of insulin. The translational implications of these findings are that the **LJ100**<sup>®</sup> extract containing the peptide could be used clinically to enhance the release of insulin from the pancreas and enhance insulin action at insulin-sensitive tissues like the adipose and muscles of diabetic patients, with resulting improvement in glycemia.<sup>26</sup>





## **LJ100<sup>®</sup> is Sustainable**

HP Ingredients is committed to the health and sustainability of indigenous peoples. For **LJ100<sup>®</sup>**, in Malaysia, we continue to support the Orang Asli communities by hiring only the Orang Asli to collect Tongkat our from the rainforests.

We, along with our esteemed partners, launched our sustainability project. In September 2014, 1000 Tongkat Ali seedlings were distributed to the Orang Asli for replanting around their community and forested area. Our replanting program involving villagers is officially the first in Malaysia. Blessed with an abundance of bio-resources, Malaysia has one of the world's oldest rainforests. It is also a melting pot of unique cultures comprising Malay, Chinese, Indian and indigenous traditions.

### **Significance of LJ100 Sustainability Program**

Tongkat Ali roots are best sourced from the wild. Various planting trials have shown that the species does not grow well under field planting conditions and was uneconomical due to high establishment cost and low root price after harvesting. However, integration of Tongkat Ali with various forest species and subsequent wildcrafting has proven advantageous, yielding higher quality and more sustainable Tongkat ali.

According to FAO, increasing numbers of medicinal plant species are becoming threatened or endangered due to irresponsible collection from the wild. In line with GACP principles on sustainability, Tongkat our replanting allows

the plants to regenerate as it is being collected. In this way, the long-term availability of the plant species is ensured, the medicinal plant collectors have a regular source of income and the herbal industry has a long-term supply of Tongkat Ali.

We work closely with the government of Malaysia to prevent exploitation of the Orang Asli by requiring a license to harvest the herb, and only the Orang Asli are allowed to collect Tongkat Ali in the rainforests. Further, in a concerted effort to preserve the interests of local business, we work with the Malaysian government to prevent export of the raw Tongkat Ali root to other countries, especially China.

Our program allows for approximately 500 Orang Asli to earn a better living by collecting wild herbs from the rainforest. Once the Tongkat our root material is processed, it can fetch a higher price than raw unprocessed root on the market. Therefore, a post-harvest facility was set up within the Orang Asli village to accommodate the processing of collected Tongkat Ali roots by drying, grinding and packing to prepare for transport.

This setting creates a mutually beneficial eco-system as the Orang Asli will be able to supply the raw material at a higher value, and benefit from a secure and steady demand; it also allows us to obtain raw materials with consistent standards – crucial to the extraction and manufacturing of **LJ100<sup>®</sup>**.



*Tongkat Ali growing in Malaysia rainforest*

