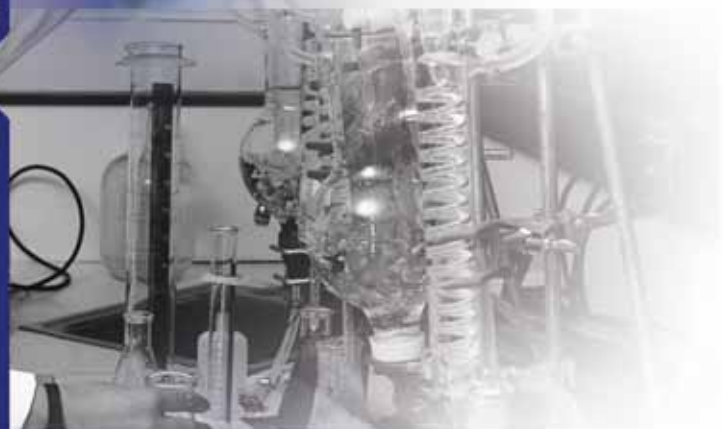
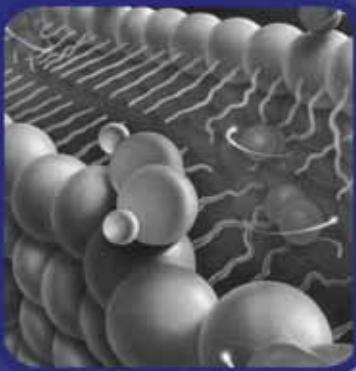
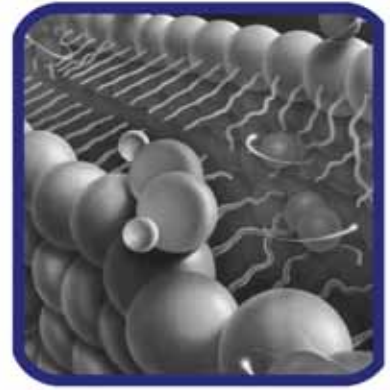


# Seminar Notes

DR BHANA

29 July 2006





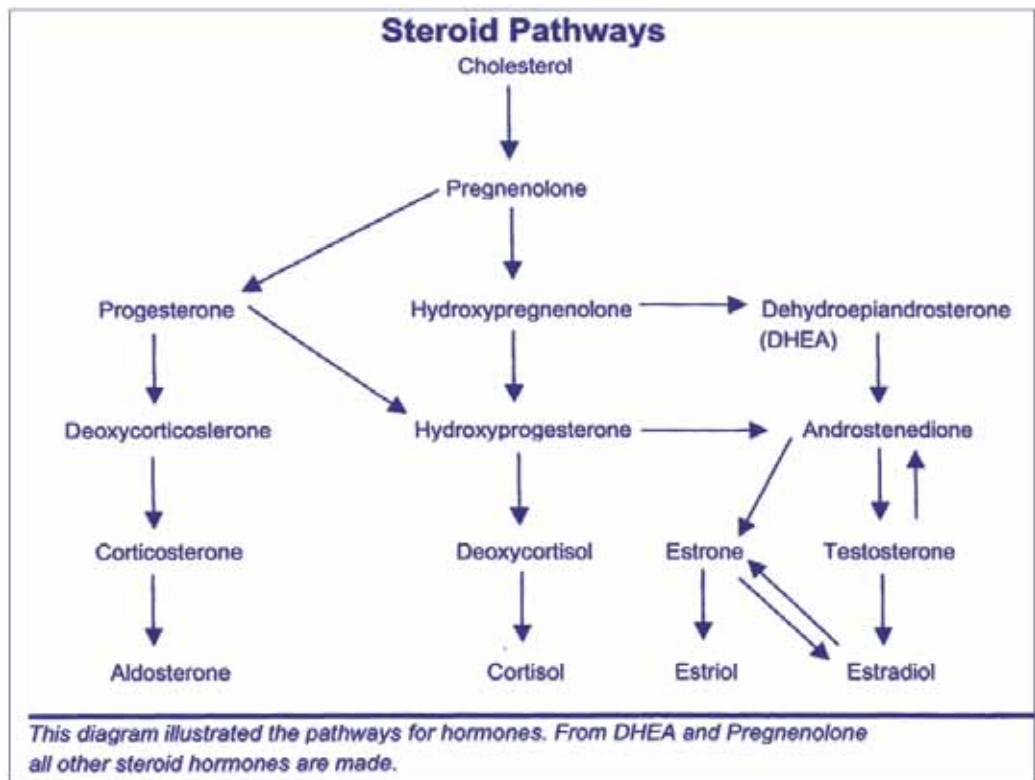
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## NHRT Dosage Guidelines

### Steroid Pathways

What is a steroid hormone?



A steroid is chemical substance with four carbon ring structures attached to each other in a very specific way. Cortisol, DHEA, testosterone, pregnenolone, progesterone, and estrogen are all steroid hormones that chemically look very similar to each other in terms of their backbone. However, they differ from each other in only small ways, and even tiny changes in the chemical make up of a substance can make enormous differences in how it functions and what role it plays in the chemical factories of our bodies. For instance, testosterone, the male hormone, is only slightly different chemically from estrogen, the female hormone. Yet that slight difference causes men to grow facial hair and women to develop breasts

### Progesterone

Vary from 25-30mg after menopause up to 400mg during menopause. This is a very individualized therapy determined by each individuals response.

Recommended doses for the treatment of specific conditions are as follows:

### Estrogen

Estrogens, particularly, triple estrogen (Triest), should never be prescribed unopposed. Estrogen should always be prescribed combined with progesterone. Research suggests that the use of combines progesterone and estrogen enhances the cardiovascular benefits of estrogen. These included increased production of HDL-0 cholesterol. Recent evidence suggests there is a direct anti-oxidant effect of estrogen.

## Dosage guidelines for stages of menopause:

### PERI-MENOPAUSE

Topical dose 5-50mg per day, days 12-25 of cycle

### MENOPAUSE

Topical dose 25-200mg per day

### POST MENOPAUSE

Topical dose 20-200mg per day

### ENDOMETRIOSIS

40-50mg daily, applied morning and night, from days 8-26 of the menstrual cycle for 3-4 month. Gradually decrease dosage to a level that keeps the pain away.

After menopause typical dose is about 15mg for day 25 to 26 days of the month.

### OSTEOPOROSIS

15-20mg per day and a low dose of Triest or Biest and/or Natural Testosterone for women who are deficient.

### PROSTATE CANCER

8-10mg per day (plus 1-2mg of Testosterone, if deficient)

### PMS

Topical dose ranges from 30-40mg / day

### PERI MENOPAUSE

#### TOPICAL

0.3 - 1.25mg daily applied once or twice daily

### MENOPAUSE

#### TOPICAL

0.625 - 1.25mg daily applied once or twice a day

### POST MENOPAUSE

#### TOPICAL

0.625 - 1.25mg daily

NOTE: With Topical applications it is best to use Bi-Est and not a Tri-Est as E1 is absorbed through the skin faster than E2 and E3.

## NHRT Dosage Guidelines

### DHEA

Average daily doses range from:

MALE 15- 100mg

FEMALE 10-30mg

MENOPAUSE 5-25mg (half this dosage for topical application)

### TESTOSTERONE

Average daily doses range from:

MALE 0-100mg

FEMALE 5-10mg

ANDROPAUSE 2.5-100mg per day tid to qid Oral dose

## PREGNENOLONE

Average daily doses range from:

RECOMMENDED DOSE	50mg - 100mg
FATIGUE	50mg
MEMORY ENHANCEMENT	50mg

**DISCLAIMER:** This doctors desk reference guide has been provided for the convenience of doctors and other medical practitioners to help their understanding and education of the prescription of natural hormone replacement therapy, it is not nor ever has been intended to be a definitive guide on this subject. Readers accept the responsibility to check the accuracy and compliance of the information provided on their own accord to ensure the safe treatment of their patients.

## Natural Progesterone

### WHAT IS PROGESTERONE?

Progesterone is a steroid hormone produced in the ovaries after ovulation, which prepares the uterus for pregnancy. Progesterone refers to the natural hormone that is manufactured naturally in the adrenal glands and ovaries. It is manufactured in massive quantities during pregnancy. Accelerated production starts in the fourth month or second trimester, 10-15 times more progesterone than before pregnancy. Natural progesterone is very useful to balance excess estrogen. Natural progesterone is also a precursor to convert to other hormones - estrogen or testosterone.

### THE ROLE AND BENEFITS OF NATURAL PROGESTERONE

Progesterone, a naturally occurring steroid hormone in both men and women, is essential for many vital functions in the human body. It is an exact chemical copy of the progesterone produced by your body. Provera and Progestin are synthetic chemical analogues similar to progesterone, but different enough to have some dramatic side effects. Progestin has actually been shown to inhibit the bio-synthesis of progesterone.

Natural progesterone does NOT produce the severe side effects that the synthetic progestins do, including increased risk of cancer, abnormal menstrual flow, fluid retention, nausea, and depression, etc. Natural progesterone, in addition to enhancing fat breakdown and preventing blood clots, counteracts carbohydrate craving that may promote obesity and cardiovascular risk. In addition, progesterone can relieve menopausal symptoms like hot flashes, reverse osteoporosis, enhance mood and libido.

### FUNCTIONS OF PROGESTERONE

Precursor of other sex hormones e.g. estrogen and testosterone	Necessary for survival of embryo and foetus throughout gestation
Maintains secretory endometrium	Normalizes zinc and copper levels
Protects against breast fibrocysts	Restores proper cell oxygen levels
Natural diuretic	Protects against endometrial cancer
Helps use fat for energy	Helps protect against breast cancer
Is a natural antidepressant	Normalizes blood clotting
Helps thyroid hormone action	Helps normalize blood sugar levels
Stimulates osteoblast-mediated	Precursor of cortisone synthesis of bone building adrenal cortex
Restores libido	Improves energy, stamina and endurance

## RECOMMENDED NATURAL PROGESTERONE DOSAGE

Natural progesterone is well absorbed through the skin into the fat layer under the skin and then into the bloodstream, riding on fatty components such as chylomicrons and red blood cell membranes. (Being fat-soluble, very little of the skin-absorbed progesterone is found in the watery blood serum.)

Progesterone can be applied topically as a cream or taken as an oral micronized progesterone troche or capsule. A minimum of 40 mg 2 times daily is required to oppose estrogen adequately and to protect the uterus.

Note: 10 mg of a synthetic progestin is equivalent to approximately 200mg Oral Micronised Progesterone.

The cream is best applied to the palms, inner arms or chest. Progesterone cream should be used only to treat menopausal symptoms and not to oppose estrogen or to prevent heart disease, osteoporosis, or reproductive cancers. For those functions, higher doses of progesterone are required that can be obtained from oral micronized progesterone.

The Neck  
The Inner Thighs  
The Inner Arms  
The Upper Chest  
The Abdomen

## Natural Progesterone in Men

Progesterone is vital to good health on both women and men. Progesterone is made in men by the adrenal glands and testes. It is the primary precursor of our adrenal cortical hormones and testosterone. Male synthesize progesterone in amounts less than women do but it is still vital. The male hormone, testosterone, is an antagonist to estradiol (E2). It is made from progesterone. Further more, it may be important in the prevention and/or treatment of prostatism and prostate cancer claims John R Lee MD.

Three Hormonal changes in Ageing Men

- Progesterone levels fall
- Estradiol levels rise
- Testosterone conversion to Dihydrotestosterone (DHT) increases.

## PROGESTERONE AND THE PROSTATE

Progesterone is the chief inhibitor of an enzyme called 5-alpha reductase that is responsible for converting testosterone to Dihydrotestosterone (DHT), a much more potent derivative that is linked to prostate cancer. Unfortunately, DHT is not as powerful an inhibitor of cancer cell compared to testosterone. When the level of testosterone decreases, the relative level of estradiol in men increases. These gradual changes can lead to estrogen dominance. In men, estrogen dominance stimulates breast cell growth and prostate hypertrophy. Estrogen dominance is responsible for the majority of breast cancers and is the only known cause of endometrial cancer in women. Since the male prostate is the embryonic equivalent of the uterus, it should not be surprising that estrogen dominance is also a major cause of prostate cancer. The prostate is embryologically the same as the uterus in the female. Research studies have shown that when prostate cells are exposed to estrogen, the cells proliferate and become cancerous. When progesterone or testosterone was added, cancer cell dies.

Estradiol, turns on BCL2 oncogene (Onco means cancer) and increases the risk of prostate cancer if adequate amount of progesterone is not there to counteract its effect by stimulating the P53 cancer protection gene.

## OSTEOPOROSIS

In the Alternative Medicine: The definitive guidebook a doctor reports working with twelve men, all in their late seventies, who were suffering osteoporosis, the physician suggested that the men systematically massage it into their skin on a daily basis. All of them began to experience relief from their condition and later reported that after three months, they were also experiencing an improved urine flow, with less pressure on their prostate glands and noticeable decrease in nightly urination. For those men who have already been chemically or surgically castrated from their prostate treatment and are at high risk of osteoporosis, Dr Lee has found that "if one wishes to prevent or treat the castration-induced osteoporosis, it is possible-to safely supplement progesterone to replace testosterone in these men."

### DOSAGE

Natural Progesterone is recommended for all men over 40 years of age or even earlier if there is a history of prostate cancer or BPH.

PROGESTERONE	DOSE FOR MEN
Progesterone	8-12m per day,
Testosterone	1-3mg per day (if deficient)
Apply directly to the scrotum twice daily	

' Dr John R Lee MD. *Natural Progesterone The Multiple Roles of a Remarkable Homone*

### SIDE EFFECTS OF PROGESTERONE FOR MEN

Dr Lee has pointed to research that suggests that too much progesterone in men can prevent sperm maturation possibly acting as a contraceptive. Progesterone does not cause feminising effects in men.

### Natural Progesterone Effective for Preventing Prostate Cancer

Present research confirms that men can also benefit from natural progesterone. In men, progesterone is synthesized by their testes to produce testosterone and in their adrenals to produce corticosteroids. The prostate gland has specific progesterone receptor sites. Healthy men continue to produce normal testosterone and corticosteroid levels into their seventies and eighties. Men also make the estrogen, estradiol, but in much lower amounts than women. Testosterone, like progesterone is an antagonist to estradiol. Estradiol stimulates the enlargement of the prostate. This allows the prostate to swell and enlarge and in many cases transform into prostate cancer. Testosterone prevents estradiol from causing prostate cancer by destroying the prostate cancer cells which estrogen stimulate. Prostate cancer is the number one cancer in men.

### THE EFFECT OF CHANGING HORMONE LEVELS IN THE PROSTATE

The prostate is the male equivalent of the uterus since they both develop from the same embryonic cells, thus also being affected by exposure to excess estrogens, endogenously or exogenously. As men age, progesterone levels decrease just as they do in women. For most women, this decrease occurs around the age of 35. In men it occurs 10 years later. When progesterone levels decrease, an enzyme called 5- alpha reductase is then able to convert testosterone to another type of testosterone known as Dihydrotestosterone (DHT). Research is discovering that it is the DHT content in the prostate which is the single most causative factor in prostate disease not testosterone itself. Studies have shown that progesterone inhibited estrogen from binding to the prostate, inhibited the formation the binding of DHT and reduced 5alpha reductase activity.

### ESTROGEN CAUSES CANCER

Estradiol also stimulate the enlargement of the prostate. When the prostate gland swells and enlarges, it is called benign prostatic hyperplasia (BHP). This condition causes the need to urinate

more frequently and urinary incontinence. Progesterone has shown to be even more effective in inhibiting 5 alpha reductase than either Proscar or Saw Palmetto, which are standard herbal treatments traditionally used

Estrogen levels increase in men who are overweight because at cells convert the male hormone androstenedione into Estrogens which stimulate prostate growth. Thus, an overweight man will have higher estradiol levels. Estrogen dominance symptoms such as weight gain, enlarged breasts, all bladder problems anxiety and insomnia also occur in \,l cells, with the exception of brain and muscle cells,

multiply continuously. The genes which regulates this cell growth are p53. If the gene bcl2 dominates it will push cells to cancer. If gene p53 dominates the opposite will occur and the cell growth is controlled and the cancer do not occur. Estradiol turns on the cancer gene bcl2 and progesterone turns on the anti-cancer gene p53! Breast cancer cells do not multiply when women are on progesterone. These hormones also worked for cancer of the ovary and uterus and small cell lung cancer which is normally a very difficult cancer to treat with a horribly dismal diagnosis.

Topical application of natural progesterone many prove beneficial in the treatment of prostate conditions. In the Alternative Medicine: The definitive guidebook a doctor reports working with twelve men, all in their late seventies, who were suffering osteoporosis, the physician suggested that the men systematically massage it into their skin on a daily basis. All of them began to experience relief from their condition and later reported that after three months, they were also experiencing an improved urine flow, with less pressure on their prostate glands and noticeable decrease in nightly urination.

For those men who have already been chemically or surgically castrated from their prostate treatment and are at high risk of osteoporosis, Dr Lee has found that "if one wishes to prevent or treat the castration-induced osteoporosis, it is possible to safely supplement progesterone to replace testosterone in these men."

## RECOMMENDED DOSAGE OF NATURAL PROGESTERONE CREAM TREATMENT FOR MEN

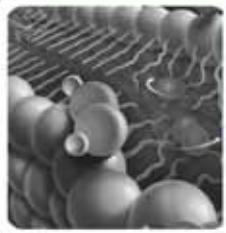
The amount of progesterone made by men is 4-6mg per day. Men can take progesterone daily without taking any time off. It is suggested that men take 5mg twice daily, applying it to scrotum. It has also been recommended to use a low dose (46mg) of natural testosterone transdermal cream. Maintaining a healthy prostate also involves other factors such as diet specific nutrients, herbs, essential fatty acids, antioxidants and stress management.

Hormonal balance is the key to male hormonal health. Balance is more about maintaining the proper ratio of hormones rather than absolute concentration levels of any one hormone. It is the ratio salivary concentrations of testosterone to estradiol that best reflects the hormone-related risk of prostate cancer. Thus, saliva testing is also an important diagnostic and predictive tool for assessing men's hormone levels. Using a combination of natural hormone approaches along with dietary and lifestyle changes would seem a much more sensible approach to prostate health and prostate cancer treatment than castration, radiation or prostatectomy. These conventional approaches can cause impotence, incontinence and bowel, stomach and rectal problems.

## Natural Hormones

### Natural Estrogen

Estrogen is one of the female hormones that help regulate a woman's passage through menstruation, fertility, and menopause. Estrogen is what makes a woman, a woman. It is estrogen that gives women their softness, curves, and breasts. Estrogen is one of the most powerful hormones in the human body. Approximately 300 different tissues are equipped with estrogen receptors. This means that estrogen can affect a wide range of tissues and organs, including the brain, liver, bones and skin. The uterus, urinary tract, breasts, skin and blood vessels also depend on estrogen to stay toned and flexible. It can be secreted directly from the ovaries (or made in fat cells by conversion from DHEA).



## FUNCTIONS OF ESTROGEN

- Responsible for normal growth and development of female sex organs
- Responsible for maintenance of secondary sex characteristics
- Protects against bone loss and heart disease
- Promote proliferation and growth of specific cells in the body

Estrogen is not a single hormone. It is a group of several different but related hormones that perform functions that we normally attribute to "estrogen".

The natural pattern of circulating estrogens is:

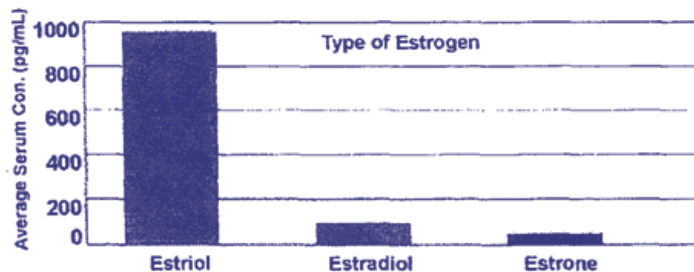
- E1 Estrone: 10-20%
- E2 Estradiol: 10-20%
- E3 Estriol: 60-80%

**Estrone E1:** The primary estrogenic hormone in the post menopausal woman, is made from peripheral conversion of androstenedione in adipose cells, liver and skin. It is also made from the conversion from estradiol. Implicated in hormone mediated cancers.

**Estradiol E2:** Estradiol is the most physiologically active form of estrogen. It is formed by the aromatization of testosterone. Estradiol is the most potent and is converted to the weaker estrone, and then to estriol when levels of progesterone rise this is the hormone that protects against osteoporosis and heart disease.

**Estriol E3:** Thought to be anti-carcinogenic; most protective estrogen ever tested against breast cancer. Research strongly suggests that estriol has less cancer-causing potential than estrone, and estradiol and it may actually inhibit the carcinogenic activity of these other estrogens [Dr J Wright; Natural Hormone Replacement for women over 45].

E3 has been shown to be clinically effective for the treatment of menopausal symptoms as well as postmenopausal symptoms and vaginal atrophy, dryness, vaginal infections, painful intercourse, and various conditions of the urinary tract.



All estrogen hormones (estrone, estradiol, and estriol) occupy the same receptor sites. This family of estrogens works in concert with progesterone to nourish and support the growth and regeneration of the female reproductive tissues, as well as impart the characteristic female growth of body hair, breasts, and distribution of body fat.

## SYMPTOMS OF ESTROGEN IMBALANCE

### LACK OF ESTROGEN -

Hot Flashes (not only symptom)  
Night Sweats  
Sleep Disorders  
Headaches  
Memo Loss

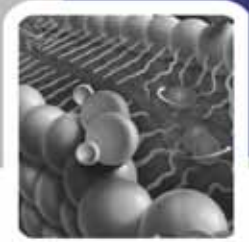
Vaginal Shrinkage  
Painful Intercourse

### ESTROGEN DOMINANCE OR OVERMEDICATION

Depression  
Foggy Thinking  
Hair Thinning or Hair Loss

Excessive Vaginal Bleeding  
Headache

Breast Enlargement and Tenderness  
Fat gain on hip, abdomen and thighs



Inability to Reach Orgasm  
Lack of Menstruation  
Yeast Infections  
Heart Palpitations  
Depression  
Mood Swings  
Anxiety  
Vaginal Dryness (painful, cell division)  
Dry Skin  
Shortness of Breath

Fatigue  
Leg Cramps- Potential blood clotting  
PMS  
Mood Swing  
Nausea, Vomiting, Bloating  
Decreased Sex Drive  
Increased risk of Breast Cancer  
Increased risk of Uterine Cancer

### ESTRIOL E3

In women, estriol is produced in large quantities (together with progesterone) during pregnancy and it is the estrogen that is most beneficial to the vagina and cervical tissue. Of the three estrogens, only estriol does not encourage cancer.

High levels of estriol have been found in vegetarians and in Asian women who consistently appear to be at much less risk of breast cancer. Research has demonstrated that women with breast cancer have a reduced excretion of estriol.

Estriol has been shown to actually inhibit breast cancer in mice. It has all the benefits of the stronger estrogens, but with fewer risks. It's only negative is that it's much weaker than other estrogens, hence more is needed to achieve the same results.

#### NORMAL ESTRIOL LEVELS

Women	< 16 pg/ml
Men	not applicable

### ESTRONE E1

In women, estrone mimics the effects of estradiol in addition to aiding it to perform its functions, though it is much weaker than estradiol. In pre menopausal women 50% of estrone is made in the ovaries and the remainder from androstene in the adrenal glands and internal organs. In postmenopausal women the normal ratio of estrone to estriol increases and with that comes most of the ill effects of estradiol. After menopause most of the estrone is made in the adrenals.

#### NORMAL ESTRONE LEVELS

Women	2-10 pg/ml
Men	<3 pg/ml

### ESTRADIOL E2

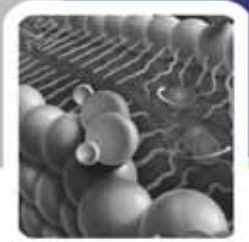
Estradiol is the most potent estrogen of a group of endogenous estrogen steroids. It is responsible for maturation of long bones, development of breasts, reproductive organs and secondary female characteristics. Estradiol is mainly produced by the ovaries, with secondary production by the adrenal glands and conversion of steroid precursors into estrogens in fatty tissue. In women, estradiol is the most potent and biologically active estrogen before menopause. It is estradiol that modulates the course of the menstrual cycle and menopause. Natural derivatives of estrogens are used extensively in replacement therapy for both menopausal women (pre and post).

Excess levels of estradiol may be associated with adverse symptoms, including increased risks of breast and endometrial cancer.

#### NORMAL ESTRADIOL LEVELS WOMEN

Menstruating (during luteal cycle, days 19-22)	0.5-5.0 pg/ml
Post Menopause	0.5-1.5 pg/ml
On Estrogen Therapy	1-1.0 pg/ml

NB - for women, if estradiol is greater than 1 pg/ml, progesterone should be at least 200 times higher.



### BIEST - (E3 & E2) ESTRIOL AND ESTRADIOL

Biest is a combination of two estrogens: estriol and estradiol. It is most commonly found in a ratio of 80:20, estriol to estradiol. This combination allows for all of the protection of estriol while providing the cardiovascular and osteoporosis benefits along with the vasomotor symptom relief of estradiol.

Biest (80% estriol and 20% estradiol) are becoming more popular due to concerns estrone may increase cancer risk. It is important for any woman with an intact uterus who is taking estrogen to also take progesterone to protect the uterus from hyperplasia (cell proliferation) and uterine cancer.

### TRiest- (E3, E2 & E1) ESTRIOL, ESTRADIOL AND ESTRONE

Triest is the combination of three estrogens: estriol, estradiol and estrone. It is most commonly found in a ratio of 80:10:10, estriol, estradiol, and estrone. This combination is very popular and contains all of the three major circulating estrogens. It is slightly weaker in its effect when compared to Biest. However, this can be compensated for by increasing the strength or by slightly changing the ratios.

### DOSAGE GUIDELINES FOR ESTROGEN

#### Daily Doses for Menopause Women using Cream

<i>TRiest</i>	0.5mg to 5mg
<i>ESTRADIOL</i>	0.5mg to 3mg (higher doses are used for poor libido and osteoporosis)
<i>PROGESTERONE</i>	10 to 40mg (higher doses can be safely used if bleeding is heavy)
<i>TESTOSTERONE</i>	0.5 to 3mg (higher doses used for poor libido)
<i>DHEA</i>	2 to 10mg (higher doses used for chronic fatigue)
<b>CANCER RISK PATIENTS</b>	
<i>ESTRIOL</i>	2-5mg daily
<i>PROGESTERONE</i>	50-200mg daily

### Synthetic Estrogens SYNTHETIC ESTROGEN

"Human estrogen consists of estrone (10-20%), estradiol (10-20%), and estriol (60-80%) whereas conjugated estrogen contains estrone (75-80%), equilin (6-15%), plus estradiol and other substances (5-19%). Equilin (a true horse estrogen) produces estrogenic effects that are much more potent and longer lasting than those produced by human estrogen. It's been estimated that 'horse estrogen' is as much as eight times more potent than human estrogen in the human body. Most other estrogens are 100% estradiol, the most powerful estrogen and suspected to be the most carcinogenic of the 3 human estrogens" [Ibid., pp. 49, 25, 57.]

Conjugated estrogen is the most commonly used oral estrogen. It's obtained from the urine of pregnant mares and undergoes a conversion in the intestinal tract to estrone (the type of estrogen most implicated with increased risk for breast cancer in studies.) The synthetic analogs of conjugated estrogen are also converted to estrone. Estrogens obtained from a horse are designed for a horse's physiology and are a foreign estrogen in a woman's body.

Premarin or conjugated equine estrogen in contrast contains the following estrogens:

#### Conjugated Equine Estrogen

Estrone	Equilin	Estradiol
75-80%	6-15%	5-19%

Compared to:

#### Natural Estrogen - TRIEST

Estrone	Estriol	Estradiol
10-20%	60-80%	10-20%

## POSSIBLE UNWANTED EFFECTS OF CONVENTIONAL CONJUGATED "ESTROGEN" REPLACEMENT:

Breast Tenderness	High Blood Pressure
Headaches	Blood Clots
Leg Cramps	Fluid Retention
Gallstones	Impaired glucose tolerance
Vaginal Bleeding	Increased risk Breast Cancer
Increased Risk of	Worsened uterine fibroids and endometriosis
Endometrial Cancer	
Nausea and Vomiting	
Estrogen for Specific Problems	

## ESTROGEN AND MENOPAUSE

Upon reaching menopause, estrogen levels fall dramatically. This decline is associated with hot flashes, a higher risk for cardiac disease, and an increase of bone loss. Estrogen supplementation can enhance mood, revive libido, improve memory and relieve hot flashes, night sweats, vaginal dryness and urinary incontinence.

## ESTROGEN AND PROGESTERONE

Hormone replacement therapy with estrogen and progesterone is widely advocated to prevent osteoporosis and cardiovascular disease.

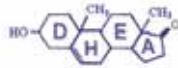
When a woman has had cancer and hormone replacement is clearly indicated, some Doctors prefer to recommend progesterone only, because it is anti-carcinogenic. Others will recommend estriol (but not estrone or estradiol) and progesterone. Estriol is less likely to induce proliferative changes in target organs of cancer-prone women than estrone or estradiol.

## Dehydroepiandrosterone DHEA

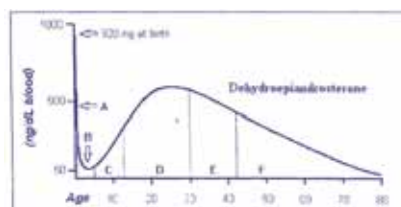
DHEA is a steroid hormone distinguished from others by its unique chemical structure. DHEA is produced by the adrenal glands (located just above the kidneys) as well as by the brain and the skin, and is the most abundant steroid in the human body. Often called "the mother of hormones" it is an androgenic hormone produced from cholesterol and leads to production of all of the other sex hormones.

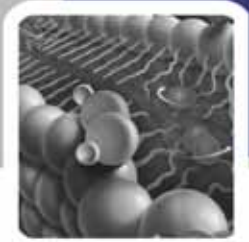
## THE ROLE OF DHEA IN THE BODY

DHEA is a "precursor" hormone-that is, it is a basic chemical that the body uses for different purposes. It is a building block of the body's production of estrogen and testosterone, and may also prop up the body.



As newborns, we have an extremely high level of DHEA, DHEA is high even while the foetus is still developing, but within a few days after birth, our DHEA levels begin decline. Then between the ages of six and eight, we experience the event called "adrenarche" in which our adrenal glands begin to stir and gear up for puberty. At the same time our DHEA level begins to rise steadily and continues to rise until it peaks at around age twenty-five to thirty. From that point on it declines at a rate of about 2 percent a year, and we begin to feel the result of this decline in our mid-forties. By age 65 we are producing about 10-20 percent of the DHEA our bodies was manufacturing at 20. This drop in DHEA levels correlates dramatically with the signs and "symptoms" associated with ageing.





### Normal DHEA

Protects the immune system  
 Inhibits tumours  
 Helps maintain good body weight  
 Improves energy utilisation

Lowers cholesterol, LDL & body fat  
 Reduces mortality, especially in men

### Low DHEA

Associated with degenerative diseases  
 Promotes bone loss  
 Causes weight gain/obesity

Low energy

May reduce mortality in women  
 Chronic Depression

### High DHEA

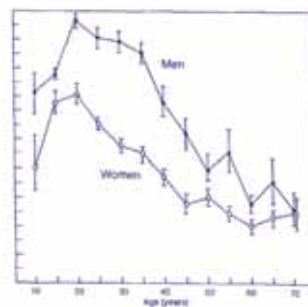
Greasy Hair  
 Oily Skin  
 Acne

Increased Hair Growth (very rare)

## STUDIES DEMONSTRATED THAT DHEA CAN:

- Improve memory and help control Alzheimer's disease
- Strengthen the immune system and protect against infection
- Help prevent bone loss
- Assist in protecting us from diabetes and autoimmune disease
- Help to fight fatigue and depression and learning problems
- Enhance feelings of well-being
- Increase strength
- Alleviate symptoms of menopause
- Protect against heart disease by lowering cholesterol and preventing blood clots
- Assist in weight loss and convert fat to lean muscle mass .
- Enhance libido
- Stabilise blood sugar levels and help prevent onset of diabetes in adults
- Lower blood cholesterol while improving liver function

DHEA levels are a key determinant of physiological age and resistance to disease. When levels are low, you are more susceptible to, ageing and disease. Men have more DHEA than women. About half of DHEA is lost by men by age 40, in women by age 45.



DHEA levels by age in men and women.

## Dehydroepiandrosterone

"There is growing clinical and experimental evidence that dehydroepiandrosterone ...plays an important regulatory role in intermediary metabolism by inhibiting the storage of dietary energy as fat. For instance, one of the predominant features associated with a DHEA deficiency in humans is obesity. ...Recently it has been reported that these inhibitory effects of DHEA on adiposity can be attributed to an increase in resting metabolism" (Journal of Nutrition 1987; 117: 1287).

## SOME FACTS REGARDING DHEA

- Women with most types of breast cancer have been found to have abnormally low levels of DHEA.
- When laboratory rats are given an injection of DHEA prior to being exposed to a potent carcinogen, they remain cancer-free.
- DHEA protects against heart disease by lowering cholesterol and preventing blood clots.
- DHEA may improve memory.
- DHEA is an immune system booster and may protect against autoimmune diseases like lupus erythematosus and rheumatoid arthritis.
- DHEA prevents bone loss.
- DHEA may promote reduction of body fat.
- DHEA acts as a buffer against stress-related hormones (such as cortisol), which is why as you get older and make less you are more susceptible to stress and disease.
- DHEA can be converted to androstenedione, and then to testosterone or estrogen.
- DHEA can help alleviate menopausal symptoms and/or reduce the amount of other hormones required by the body.
- DHEA has been shown to enhance libido, reduce impotency, and increase feeling of wellbeing.
- DHEA may reduce depression and fatigue.
- Patients with chronic fatigue syndrome are known to benefit from DHEA.
- At the same time the adrenals become stressed, midlife levels of the adrenal androgens, best exemplified by DHEA, begin their downward cascade to eventually reach 5% of their peak values at age 20.
- DHEA works mostly by slowing an inefficient pathway of energy production in the body. Research has shown up to a 25% lifespan extension with addition of DHEA to animal chow.
- DHEA is being explored in relation to autoimmune conditions, heart disease, diabetes, and obesity. Its anabolic and immune-enhancing effects have led to its use as an adjunctive treatment in AIDS and for helping weak and elderly patients respond better to vaccines. Its preventive effects extend to many forms of cancer.

### DOSAGE

MEN	WOMEN
15-100mg	10-30mg
per day	per day

Men with prostate cancer or women with ovarian cancer should avoid DHEA replacement therapy, as the hormone stimulation associated with DHEA may aggravate those conditions.

## Hormone Profile

### Testosterone

Testosterone is a powerful anabolic hormone. Just as estrogen and progesterone are the female hormones, testosterone is the male sex hormone (although women have testosterone levels one-tenth to one-twelfth those of men.)

### INDICTORS OF LOW LEVELS OF TESTOSTERONE:

Reduced libido  
Can cause fatigue  
High body mass index (obesity) Irritability  
Abdominal fat Depression  
High glucose and insulin levels  
Aches and pain in the joints  
Decreased bone density and - Osteoporosis  
Osteoporosis  
Weight Loss  
Thin and dry skin

MEN (Testes)	FEMALE Ovaries
20 to 30 mg Per day	2 to 3mg per day

Testosterone is synthesized primarily by the testes in males, the ovaries in females, and adrenal glands of both sexes. Testosterone is synthesized from androstenedione, a metabolite of DHEA and progesterone, the precursors of which are pregnenolone and cholesterol.

### TESTOSTERONE AND ANTI AGEING

Ageing is primarily due to tissue breakdown, which is a catabolic process. Evidence suggests that testosterone can slow the slide into catabolism (tissue breakdown) associated with ageing and can help restore the body's physiologic processes to a more youthful condition. Testosterone promotes the building up of body tissues like muscle and bone, and a lot of research has been done in the role of testosterone in osteoporosis. It has not yet been established if testosterone acts directly on bone, via receptors, or as precursors for oestrogen biosynthesis, but either way it is known that its presence is essential.

### TESTOSTERONE AND THE HEART

Studies by Dr Jens Moller, a Danish Researcher suggested that testosterone may play a crucial role in protecting us against atherosclerosis and heart disease. Some evidence suggest that natural testosterone replacement can reduce the risk of serious heart disease. Testosterone is a muscle-building hormone, and there are many testosterone receptor sites in the heart. Testosterone is not only responsible for maintaining heart muscle protein synthesis, it is also a promoter of coronary artery dilation and helps maintain healthy cholesterol levels.

### THE EFFECTS OF LOW TESTOSTERONE ON CARDIOVASCULAR SYSTEM

- Cholesterol, fibrinogen, triglycerides and insulin levels increase Coronary artery elasticity diminishes
- Blood pressure rises
- Human Growth Hormone declines, weakening heart muscle
- Abdominal Fat increases

A number of studies show a relationship between low testosterone levels and elevated triglycerides and LDL Cholesterol, and high testosterone levels with increased HDL cholesterol. One study showed that blood flow to the heart improved by 68.8% with testosterone therapy.

### RESEARCH STUDIES ON TESTOSTERONE

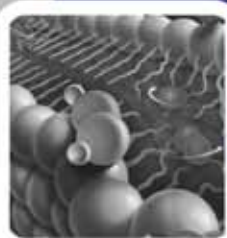
Testosterone increases bone mineral density of spine and hip, fat-free mass, prostate volume, erythropoiesis energy and sexual function [Journal of Clinical Metabolism, August 2000]

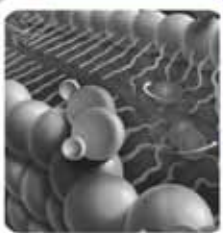
A recent study has shown that women with osteoporosis who took a combination of estrogen and testosterone increased their bone density. [Dr- J Wright; Natural Hormone Replacement for Women over 4: Pg 84]

In men, testosterone is produced in the testes, by a group of cells known as Leydig cells. These cells begin secreting high doses of testosterone during puberty to trigger increased lean muscle mass, sex organ growth bone formation, deeper voice, and higher energy levels. Peak testosterone levels are reached in a man's early to mid-20s.

As a man ages, the Leydig cells that secrete testosterone begin to wear away. Because of this, between the ages of 40 and 70, the average man loses nearly 60% of the testosterone inside his body. Other lifestyle factors, such as overtraining, stress and alcohol, can also hasten the deterioration of Leydig cells, and cause testosterone levels to drastically decline.

Testosterone stimulates the body's development of muscle, bone, skin, and sex organs, along with masculine physical features, such as hair growth. Recently, scientists have discovered that testosterone also improves mental power, by enhancing visual and perceptual skills. Low levels can disrupt the body's blood sugar metabolism, leading to obesity and diabetes. Chronic deficiencies may also promote the early onset of osteoporosis and heart disease. Its use is popularly associated with enhancing libido but research is indicating that it is a vital factor in the prevention of cardiovascular disease as well as improving energy, levels, bone density, muscle tone, prostate health, moods and vitality.





Recent research regarding the effect of testosterone on ageing demonstrates a gain in lean body mass and a possible decline in bone loss when used in elderly patients. Testosterone enhances aerobic metabolism and increases protein synthesis in males and females. This hormone decreases with age in both males and females. From puberty through the reproductive years, males synthesize 20 times more testosterone than females.

## **DOSAGE GUIDELINES**

### **TESTOSTERONE DOSAGE**

Transdermal Dosing                      50- 400m per day l  
Prof Thiény Hiertoghe: The Hormone Solution

### **SIGNS OF TOO HIGHER DOSAGE**

- Over-developed muscles
- Excess Body Odour
- Greasy Hair
- Exaggerated Aggression
- Disruptive Sexual Desire

### **Testosterone in Men Andropause**

"Andropause" involves the progressive decline of free testosterone levels with age, coupled with an increase in production of a protein called sex hormone-binding globulin. Testosterone links with the protein, reducing its availability to the tissues. As a result of these hormonal changes, men as early as age forty can develop impotency or libido problems.

Just as the ovarian function at the time of menopause for women has substantial physiologic consequences, including an accelerated loss of bone mass, sleep and behavioural changes, vaginal atrophy and the loss of fertility, Andropause can also have profound effects on health and wellbeing in men, particularly on mood and libido and some even experience sweating and hot flushes at night.

### **SYMPTOMS OF ANDROPAUSE**

Decreased energy and strength  
Increased body fat  
Increased Fatigue  
Osteoporosis  
Depression  
Loss of eagerness and enthusiasm  
Decreased mental acuity  
Inability to maintain muscle  
Increased risk of cancer  
Increased risk of heart disease  
Increased risk of arteriosclerosis  
Decrease libido  
Decreased Strength of orgasm  
Decreased sensitivity to stimulation  
Increase in LDL cholesterol  
Decreased erectile function

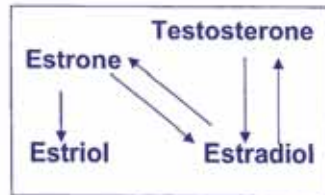
The difference is that men experience a more gradual and incomplete loss of testicular function with increasing age resulting in reduced testosterone and sperm count.

Testosterone levels in men remain relatively constant until about the age 50, at which time they begin to fall slowly.

The most significant hormone imbalance in ageing men is a decrease in free testosterone while estrogen levels remain the same or precipitously increase. Men suffer from the dual effects of having too little testosterone and excess estrogen as a result of testosterone increasingly converting to estrogen. Transdennal Progesterone cream can be used as a treatment option as progesterone inhibits aromatase (which reduces testosterone to dihydrotestosterone. Applied 2-5 mg per day. [IJPC Vol 6 No. 6 2002: 459]

## CAUSES OF LOW TESTOSTERONE

- Age
- Excess aromatase enzyme causing more testosterone to convert to estrogen.
- Ageing Testicles produce less testosterone
- Liver Enzymatic activity
- Obesity
- Alcohol dependency



## Testosterone in Women

In women, testosterone is produced in the ovaries, adrenal glands and to a lesser extent in the skin, brain and liver.

The ovaries continue to secrete testosterone following menopause, but there is a gradual decline as a woman ages after menopause. This decline is not rapid or substantial as the decline in level of oestrogen and progesterone.

In women, testosterone enhances the sex drive, helps relieve menopausal symptoms, restores lost energy, strengthens bone, elevates mood and increases sensitivity to sexual pleasure in the nipples and genitals.

## TESTOSTERONE AND MENOPAUSE

When the ovaries shut down during menopause, the quantity of testosterone produced is cut in half. Women who are taking NHRT usually respond and hot flushes and other symptoms of menopause are lessened. However, a small number of women do not. Researchers believe that these women may be more sensitive to the accompanying loss of testosterone.

Dr John Moran of the Optimal Health Clinic in London has pioneered hormone replacement therapy over the past decade, prescribing testosterone to men and women. He has noticed that many women respond positively when a small amount of testosterone is added to their NHRT program. Notably, libido and energy seem to be replenished.

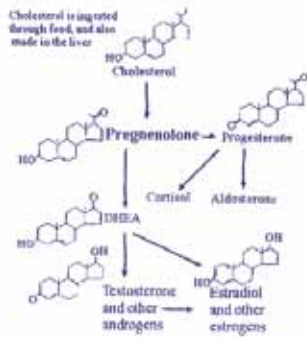
In women, excess testosterone can have undesired side effects, such as acne, hirsutism, baldness and deepening of the voice. Side effects to low conservative dosages are very rare. Typical side effects for women are: deepened voice, enlarged clitoris, acne, increased facial or chest hair.

## Hormone Profile Pregnenolone

Pregnenolone is a steroid precursor produced in the human adrenal gland and in the human brain. It is sometimes called "brain steroids," since the brain contains higher concentrations than other organs or the blood. It is produced in the desired amounts only if a person's body has adequate amounts of cholesterol, vitamin A, thyroid hormone, and enzymes. If these levels are insufficient, a low supply of pregnenolone will result.

In a healthy person, the conversion of cholesterol to pregnenolone occurs inside the mitochondria. Once produced, pregnenolone leaves the mitochondria, and does not inhibit its own synthesis. In fact, both progesterone and pregnenolone stimulate their own synthesis, therefore additional doses do not suppress the body's ability to synthesize them. In the cell's cytoplasm, enzymes

convert pregnenolone into either progesterone or DHEA, depending on the type of cell and the present need. These are then the precursors for the more specialized steroid hormones, including cortisol, aldosterone, estrogen, and testosterone. Taking progesterone will not, however, increase the levels of these hormones.



## FUNCTIONS OF PREGNENOLONE

- Precursor of many other hormones
- Boosts immune system
- Fights the effects of fatigue and stress
- Protects against coronary artery disease
- Relieves arthritis pain
- Improves heart health
- Improves mood and memory
- Essential to full brain function
- Protects against Alzheimer's disease
- Aids in skin rejuvenation
- Assists in alleviating stress

An article in the Proceedings of the National Academy of Sciences (Nov. 6, 1995), describes pregnenolone as "the most potent memory enhancer yet found."

Some people find pregnenolone improves energy levels, vision, clarity of thinking, and wellbeing, perhaps also sexual enjoyment. Some women report lessening of hot flashes or premenstrual symptoms.

Pregnenolone levels are similar in both males and females. Studies have shown that at birth, the values are very high, at about 109 ug/dl of blood. During the first day of life levels may drop to 86 ug/dl of blood, and decrease to a mean value of 53 ug/dl during the first month, 11 ug/dl between four and six months, and 3.7 ug/dl between seven and twelve months. At two years pregnenolone levels are quite low, remaining so throughout the ninth year. This is followed by a progressive rise until adulthood, when adults are found to have pregnenolone levels that are three to four times higher than those found during the first decade of life. Brain concentrations peak at around age thirty and later decrease to 5% of that value, thereby increasing the need for supplemental pregnenolone as we age.

## Pregnenolone and Specific Problems

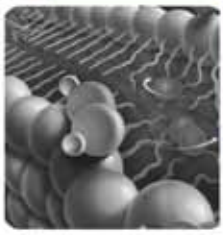
### FATIGUE

In the mid 1940s, several studies indicated that a daily dose of 50 mg of pregnenolone reduced fatigue and stress among factory workers, airline pilots and other subjects (Pincus) Today, there are millions of people who suffer from stress and fatigue who may find relief with pregnenolone.

### ARTHRITIS

One health condition is rheumatoid arthritis. Since it is a precursor to the production of cortisol in the body pregnenolone was used as early as the 1940s as a treatment for rheumatoid arthritis. In daily doses ranging from 50 mg to 700 mg, pregnenolone was found to be effective for this

condition and to be much safer than the corticoids, salicylates and other drugs used as treatments at the time. Daily doses of pregnenolone above 200 mg appeared to be more effective than those below 200 mg. (Davidson)



### **MEMORY ENHANCEMENT**

Pregnenolone has been found to play an important role in the acquisition of knowledge and the long term memory of learned behaviour. (DeWied 1976, 1977). In a study with rats by Flood et al. (1995), pregnenolone was found to enhance memory at doses far lower than doses required of other steroids or steroid precursors, including DHEA.

Pregnenolone blocks the inhibitory amino acids glycine and gamma-aminobutyric acid (GABA), as well as non-NMDA glutamate. As a result, pregnenolone helps to regulate the balance between excitation and inhibition, a major dynamic in the CNS.

### **NERVE GENERATION**

Administration of either pregnenolone or progesterone in mice also promoted myelin formation during nerve regeneration. (Koenig) (The myelin sheath is a membrane that protects or insulates various parts of the nerve cell, preventing short-circuiting or loss of neural transmission.) This suggests a possible role for supplemental pregnenolone in conditions involving demyelination, such as multiple sclerosis.

### **REPAIR OF ENZYMES**

Pregnenolone appears to have the ability to repair enzyme activity. A Russian study demonstrated that adding pregnenolone to a mitochondrial suspension increased the activity of the enzyme that converts cholesterol into pregnenolone.

### **ANTI-INFLAMMATORY EFFECTS**

Scientists have found that pregnenolone also has anti-inflammatory effects. When it was administered immediately after spinal cord injury, it reduced histopathological changes, spared tissue, and aided the restoration of motor function.

Pregnenolone was used in the late 1940's to treat rheumatoid arthritis but fell into disuse when cortisone was discovered. Unfortunately, the toxic effects of cortisone are many and severe, classically involving daytime euphoria, insomnia, hot flushes at night, osteoporosis, and adrenal atrophy or shrinking. In contrast, pregnenolone was never found to have adverse side effects, and can be used to withdraw from cortisone therapy over a one-month period. This can be accomplished without the development of "Addison" disease symptoms, which can sometimes result from adrenal atrophy, because of pregnenolone's normalizing effects on the adrenal gland.

### **DOSAGE**

Since both DHEA and pregnenolone have some similar effects (however, they have differences, too), you should lower your dose of DHEA when you go on pregnenolone. The lowering of the dose should be the same amount as the pregnenolone dose. Before you add pregnenolone, though, make sure you try it separately to see what kind of effects it has on each individual. Once you know how you react to DHEA and pregnenolone separately, you can then combine them.

### **SAFE & EFFECTIVE DOSE PREGNENOLONE**

50mg to 200 mg Per Day