The Hormonal Fountain of Youth

“...the symptoms of old age may appear in quite young persons after changes in the ductless glands...”

Arnold Lorand
Old Age Deferred, 1910

Levels of many hormones decline with aging and the decline in these hormone levels parallels the multiple physiological changes that occur with aging. This has led to the question of whether these changes that occur with aging are due to hormonal decline. The non-evidence based approach to this concept has spawned the field of anti-aging medicine where practitioners prescribe a multitude of hormones to reverse the aging process. In most cases there is little evidence to support letting loose this Pandora’s box of hormones and relatively strong evidence that many of these hormones may have deleterious effects in older persons. Here we will explore the evidence both in favor of and against hormone replacement as we grow older.

**Vitamin D**

Of all the hormones, the one for which there is the most evidence to give to older persons is also the one least often touted by so called anti-aging experts - vitamin D. Studies at Saint Louis University have shown that vitamin D levels decline longitudinally with age (1). Numerous studies have demonstrated that calcium (at least...

(continued on page 2)
had escaped from the bottle and growth hormone had become the centerpiece of a rapidly growing anti-aging industry. As recently documented on the television show 60 Minutes, while growth hormone is an important therapy for children and adults with hypothalamic-pituitary disease, it is not a cure for aging.

Mice with growth hormone deficiency live longer than those with normal growth hormone levels. In a study in Paris, persons with high normal growth hormone levels had more heart disease and cancer, and a greater death rate (6).

Overall there is little evidence to support the use of growth hormone per day) and 800 international units of vitamin D daily reduce hip fractures in men and women (2). In addition, a low vitamin D level is associated with a decline in muscular strength, sarcopenia, and reported disability and is an independent predictor of falls. Supplementation appears to improve strength and performance (3) in persons with low Vitamin D levels. Vitamin D also has positive effects on immune function. All females at the time of menopause should start on a calcium and vitamin D supplement and men should start by 60 years of age.

**Growth Hormone**

With aging there is a decline in growth hormone and insulin-growth factor-1 (IGF-1). In 1990, Dan Rudman published an article in the *New England Journal of Medicine* that suggested that growth hormone might “rejuvenate” men over 60 years of age (4). Three years later his group produced a second article pointing out that many of these men now had arthralgia or carpal tunnel syndrome and breast enlargement (5). However, by this time the evil genie

**GHRELIN**

Ghrelin is a hormone produced from the juices of the stomach. It increases food intake and produces growth hormone in older persons. While it increases muscle mass, it fails to increase strength. Used long term, it produces negative side effects. Growth hormone may have a role in short-term management of older malnourished persons. A variant of IGF-1, mechanogrowth factor, which is increased by resistance exercise, appears to play an important role in maintenance of muscle repair and strength.

**Effects of Ghrelin**

- ↑ memory
- ↑ feeding
- ↑ Growth Hormone
- hippocampus
- hypothalamus
- GHRELIN
- Fundus
I wonder why geriatricians have failed to hear the exhortation of the poet to rage against the dying of the light. First we allowed ourselves to go to a one year fellowship – a total disaster in retrospect for geriatrics and for the development of high quality geriatricians. We have failed to successfully argue the importance of subacute units (geriatric evaluation and management units) and acute care for the elderly units despite the data showing that they improve outcomes. In my opinion we are failing to create a cadre of high quality researchers who will be the next leaders in geriatrics. Finally, we have failed to stop Congress from de-funding geriatric education.

We are living in a time of increasing ageism. It is a time for us to tell our political leaders to step up to the plate and begin to hit home runs when it comes to caring for the elderly person rather than to attempt to stay at the Mendoza line and live with the status quo. Our batting average is bad; it’s time to work hard to improve it. We owe this to our patients and to our older friends, but just as importantly we owe it to ourselves, as we too will soon be old. We need to speak out against the charlatanism of the so-called anti-aging experts who have more members following their questionable practices than there are in the American Geriatrics Society which is dedicated to improving the health of older Americans. We need to stop acting as though pharmaceutical evidence developed in persons under 70 or 80 years of age is good evidence-based medicine for the older patient.

It is time that we join Dr. Bob Butler who has for years spoken out against ageism. But at the same time we must put our own house in order – we must strive for excellence in geriatric care, not mediocrity. To do this we need to follow the example of Mahatma Gandhi, Nelson Mandela, and Martin Luther King Jr. It is time that we embark on the pathway of nonviolent civil disobedience and fight ageism by demanding the social justice of quality health care for older persons. It is time for us to show agape (universal love) for our patients and our profession. We need to do this without concern for our own glory but because it is the right thing to do.

Dr. John E. Morley

John E. Morley
hormone release. There is an interest in developing ghrelin agonists for use in older persons. However preliminary data seems to only suggest that it will be useful in older persons who are malnourished.

Estrogen: From Feminine Forever to Too Hot to Handle

From the 1950’s onward, it was accepted that estrogen therapy would keep women young and prolong their life. Unfortunately these opinions were based on non-randomized controlled trials. More recently, the Heart and Estrogen/progestin Replacement Study (HERS) trial and the Women’s Health Initiative have cast doubt on this assumption. It is now known that hormone replacement therapy increases coronary heart disease, breast cancer, stroke, and pulmonary embolism in older women. This is offset by a decrease in colon cancer, hip fracture, and endometrial cancer. Overall, estrogen has a minimal effect on mortality. Based on those studies it is now concluded that hormone replacement therapy should not be given to women over 60 years of age. While somewhat controversial, it would seem that there is a place for hormone replacement therapy in women with premature menopause and also for symptomatic treatment of menopausal symptoms for up to five years following natural menopause.

In the longevity stakes, it has been shown that the older a woman is at the time of her menopause, the longer she will live. The fact that cigarette smoking represents a major cause of premature menopause is one more reason to encourage women to stop smoking.

Women’s Health Initiative Studies

Calcium and Vitamin D Study
The effect of Calcium Plus Vitamin D supplementation on risk of fractures and colorectal cancer - Feb 2006

Dietary Study
Low-fat dietary pattern and risk of breast cancer, colorectal cancer, and cardiovascular disease - Feb 2006

Hormone Trials
Effects of conjugated equine estrogen on stroke in the Women’s Health Initiative - May 2006
Effects of Conjugated Equine Estrogens on Breast Cancer and Mammography in Postmenopausal Women with Hysterectomy - Apr 2006
Venous Thrombosis and Conjugated Equine Estrogen in Women without a Uterus - Apr 2006
Conjugated Equine Estrogens and Coronary Heart Disease - Feb 2006
The effect of conjugated equine estrogen on diabetes incidence - Jan 2006
Symptom Experience After Discontinuing Use of Estrogen Plus Progestin - Jul 2005
Effects of Estrogen with and without Progestin on Urinary Incontinence - Feb 2005
Estrogen plus Progestin and venous thrombosis - Oct 2004
Effects of Estrogen-Alone on Dementia and Cognitive Function - Jun 2004
Effects of Conjugated Equine Estrogen in Postmenopausal Women with Hysterectomy - May 2004
Effects of Estrogen Plus Progestin on Risk of Colorectal Cancer - Mar 2004
Estrogen Plus Progestin and the Risk of Peripheral Arterial Disease - Dec 2003
Effects of Estrogen Plus Progestin on Risk of Fracture and Bone Mineral Density - Oct 2003
Effects of Estrogen Plus Progestin on Gynecologic Cancers and Associated Diagnostic Procedures - Oct 2003
Estrogen plus Progestin and Risk of Coronary Heart Disease - Aug 2003
Estrogen plus Progestin Effects on Breast Cancer and Mammograms - Jun 2003
Effects of Estrogen plus Progestin on Dementia and Cognitive Function - May 2003
Effects of Estrogen plus Progestin on Stroke in the Women’s Health Initiative - May 2003
Effects of Estrogen plus Progestin on Health-related Quality of Life - Mar 2003
Risks and Benefits of Estrogen Plus Progestin in Health Postmenopausal Women - Jul 2002

Additional information is available at [www.whi.org/findings](http://www.whi.org/findings)
The recent doubts on the utility of hormone replacement have led to enthusiasm to look for other forms of estrogen including so-called “natural” hormones. Of these, the selective estrogen receptor molecules (SERMS) such as saloxifene, appear to both increase bone mineral density and decrease breast cancer. Testosterone levels decrease rapidly in women from 20 to 40 years of age. Testosterone replacement in women increases libido, general well-being, bone mineral density and muscle mass, and decreases mastalgia (breast pain) and headaches. However, the available studies have only been for short time periods and in limited numbers of women. In addition, it would appear that relatively high doses of testosterone are required to produce some of these effects. The development of new delivery systems such as nasal testosterone may solve some of these problems.

**Tibolone**

Tibolone is a synthetic steroid that has progestogenic and estrogenic effects, as well as some androgenic properties, and it appears to have many potentially positive effects in women (see figure). However, it is not yet available in the United States and is still undergoing testing.

**DHEA**

Dehydroepiandrosterone (DHEA) is a testosterone precursor that has been commonly touted as a “true fountain of youth.” However, the DHEA study in 288 men and women between 60 and 79 years of age found minimal effects with improved skin status and a small increase in libido in older women (7). There was no effect on muscle strength, muscle mass, or fat mass. In our studies, we found that only half of the DHEA on the market in St. Louis had bioavailable DHEA in it. Thus, DHEA would appear to be an excellent placebo.

Questions? FAX: 314-771-8575     email: aging@slu.edu
Pregnenolone – The Steroid Hormone Processor

Pregnenolone is made from cholesterol in the adrenals and in the gonads. It is the processor for DHEA, estrogen, and testosterone. Early studies showed that it improved accuracy of gunners in shooting down planes (see figure) and improved the accuracy of factory workers making bayonets in World War II (see figure). Subsequently, work at Saint Louis University demonstrated that pregnenolone was the most powerful known memory enhancer in mice (8). Unfortunately, this neurosteroid has not been shown to produce the same effects in humans.

Melatonin – The Sleep Hormone

Melatonin is produced in pineal glands deep inside the brain (see figure). Melatonin levels peak during the night and decline during the day. There are marked decreases in melatonin levels with aging. Melatonin is thought to play a major role in inducing sleep.

Recently, a drug that acts as a melatonin-receptor agonist for the MT1 and MT2 melatonin receptors was approved for the treatment of insomnia. This drug is called ramelteon (Rozerem®). It has been shown to produce a reduced latency to persistent sleep in older persons. Melatonin also enhances the immune system and is a potent antioxidant. (continued on page 16)
Searching for the Fountain of Youth: From Science Fiction to Long-Lived Mice

“Sometimes I get so mad, I feel like just up and diluting his anti-gerasone,” said Em. “That’d be against Nature, Em,” said Lou, “it’d be murder. Besides, if he caught us tinkering with his anti-gerasone, not only would he disinherit us, he’d bust my neck. Just because he’s one hundred and seventy-two doesn’t mean Gramps isn’t strong as a bull.”

Kurt Vonnegut, Tomorrow and Tomorrow and Tomorrow, 1954

In his 1941 novel, Methusaleh’s Children, Robert Heinlein told the story of Ira Howard who died of old age in the mid-1800s at age 48. He gave his fortune to form a foundation that would try to prolong life. The foundation decided to have marriages between people who had healthy, vigorous grandparents. A dozen generations later, this selective breeding had paid off, with descendants of the Howard Family living well over 120 years and Lazarus Long having lived for over 200 years.

Richard Miller at the University of Michigan has repeated this experiment in real life with mice. He showed that, with selective breeding of a mutant dwarf mice that he could breed a mouse that could live for the human equivalent of 100+ years. His longest-lived mouse, to date, has been a mouse called Yoda, pictured below, who lived for 1,462 days, a year longer than the average mouse and equivalent to about 136 human years. Miller’s mice were bred to be smaller, which appears to be an important characteristic of longevity. Yoda lived longer than the calorically-restricted mice which had previously won the Methusaleh prize for living 1,356 days.

Larry Niven in his novel “A World Out of Time” (1976) developed “young-forever” a magical potion that when given to children by their parents just before puberty ensured that the children stop growing older. “They live nearly forever. There is no resultant rise in numbers, because these children do not have children.” Thus, with the advent of “anti-gerasone,” science fiction writers have produced a future longevity agent.

Agents that inhibit growth hormone might be another such longevity agent. The growth hormone receptor knockout mouse (GHRKO) is long-lived and the bovine GH Transgenic (bGHTg) mouse which over-expresses growth hormone is short-lived.

Recently, Japanese researchers developed a mutant version of the Klotho gene. These mice age very rapidly with skin shrinkage, atherosclerosis, osteoporosis, ectopic calcifications, hypogonadism, emphysema, and early cognitive failure. They appear to have increased oxidative stress. Klotho is a beta-glycosidase-like hormone. It inhibits the action of insulin growth factor-1 and, to some extent, insulin. The major effect of Klotho appears to be its interaction with calcium metabolism and 1,25 hydroxy vitamin D. Overexpression of Klotho resulted in an 18-31% increase in lifespan; but a decrease in the number of offspring the mice could produce. Thus, Klotho is now being studied as the “young-forever” of the future. It vies with the Methusaleh gene in the fruit-fly which increased longevity by 30%.

Despite all this recent excitement, we remain a long way from producing persons living to the 969 years of Methusaleh as reported in the Bible.
Dr. John Morley was the Saint Louis University faculty member who was chosen to become an honorary member of Phi Beta Kappa in 2006. In his address to the students he discussed the meaning of agape, or Universal Love, as it applied to these future leaders of our society. He pointed out that Pope Benedict XVI had chosen this subject for his first encyclical.

There are four basic types of love: eros (romantic love), storge (love for family), philia (love between friends) and agape or universal love. Agape refers to unselfish love for all human beings. It is a love that is given without expectation of anything in return. Dr. Morley pointed out that this is a basic belief not only for Greeks and Christians, but also for Buddhists and Maoists. The followers of MoZi so strongly believed in the need to help the underprivileged that they raised militia to fight for weak groups that were being attacked by others. Agape represents the highest form of behavior to which we all should aspire.

Paracelsus considered that agape was the essential quality for someone to be a physician. Dr. Morley pointed out that the principle of agape requires all of us to address the issue of global health and social justice. Not to pay attention to the evils one sees around oneself makes one, according to the Talmud, worse than the person who is committing the evil.

The United States spends 16% of its Gross Domestic Product on healthcare yet it is not among the top 25 countries in healthcare outcomes. In fact, the USA consistently ranks only slightly better than Cuba in the WorldHealthOrganization(WHO) rankings as a quality healthcare provider. The reasons for this, as shown in a recent article in the Journal of the American Medical Association comparing health outcomes in the USA and United Kingdom, are multi-factorial. Surely amongst them is the lack of universal healthcare and our patchy network of poorly-cobbled together healthcare services. In addition, the focus on “high tech” rather than “high touch” medicine must also take its share of the blame. The American focus, away from prevention and towards cure, represents another system-wide problem.

The Millennium Development Goals of the United Nations were published in September 2000. First and foremost of these is the need to eradicate extreme poverty and hunger. Colin Powell, who was then the US Secretary of State, pointed out that, “The war against terror is bound up in the war against poverty.” In April 2004, George Bush stated, “As the greatest power on the face of the Earth we have an obligation

(continued on page 20)
Loneliness is a big problem in nursing homes and other kinds of long-term care facilities. One reason for loneliness is that the residents are separated from their loved ones, including their pets. Pets offer unconditional love and attention and in their absence can be sorely missed. More and more nursing homes have a resident dog, cat, or other animal, but hardly anyone is looking at how those animals can best be used. Two Saint Louis University doctors, Marian Banks, DNS, and William A. Banks, MD, are looking at ways that animal-assisted therapy, or AAT, can best be used to combat loneliness in a very unique way: They are comparing a mechanical dog to a live dog.

Aibo is a robotic dog that is very popular in Japan and used there as a household pet. It doesn’t need to eat or go to the bathroom and so is considered by many Japanese with hectic schedules to be an ideal pet. Those qualities might also make it an ideal pet for the old and disabled who can’t take care of a living dog. Aibo is about 8 inches tall, and has a hard plastic body and endearing ways. It can emit a series of noises and lights and learns to respond to individuals very quickly.

Whether residents will prefer Aibo or the living dog is not as clear as many might think. Some people think that Aibo will be preferred to the living dog because it has so many ideal characteristics. Others think that the warmth of a living dog could never be replaced by a machine. The answer is, of course, that each has its strong points and the perfect pet may depend on one’s individual needs and likes. In the meantime, looking at how people in nursing homes respond to Aibo versus a living dog will help Saint Louis University researchers better understand the needs of nursing home residents and how better to meet those needs.
Dr. Morley Becomes Interim Chief of Endocrinology

When Dr. Arshag D. Mooradian left Saint Louis University to become Chief of Medicine at the University of Florida, Jacksonville, Dr. John E. Morley, who is already division Chief of Geriatrics, was appointed the interim division Chief of Endocrinology. Dr. Morley sees this as an exciting opportunity for the divisions of endocrinology and geriatrics to work more closely together. “Between the two divisions we have six physician endocrinologists, four Ph.D.’s, and a nurse practitioner working in the endocrine field. The close interaction of the two divisions will give us a synergy that will allow us to develop exciting joint programs in geriatric endocrinology and in clinical and basic research.” Among the programs being developed are a diabetes clinic and education program for mature diabetes, a focus on osteoporosis and hip fracture, and a focused clinic on late-life hypogonadism and sexual dysfunction. In addition, the Division of Geriatrics will continue to focus on nutritional problems in the elderly and will borrow expertise from the Division of Endocrinology to develop a lipid clinic with a focus on small dense LDL cholesterol.

The joint faculty involved in these projects includes: Stewart Albert, M.D., an expert in diabetes; Alan Silverberg, M.D., who will focus on thyroid nodules and cancer in older persons; Kent Wehmeier, M.D., who, together with H.M. Perry III, M.D. in geriatrics, will develop the osteoporosis clinic; Dr. Margaret Wilson, also from geriatrics, who will continue to guide the hip fracture service; James Armbrecht, Ph.D., who will continue his research on vitamin D metabolism and bone; Dr. Morley who will be responsible for the late-life hypogonadism and sexual problems of the elderly; Michael Haas, Ph.D., who will continue his work on lipids but will also work with Matt Haren, Ph.D., on the molecular biology of sarcopenia. They will be joined in this effort by Vijaya Kumar, Ph.D. in geriatrics; and William Banks, M.D., an expert on leptin and hormones, and the blood brain barrier who will utilize his scientific background to advise on obesity treatment, together with Drs. Albert and Morley; geriatricians David Thomas, M.D., and Margaret Wilson, M.D., will run the nutrition clinic; Dr. Albert will lend his expertise in developing the lipid clinic; Sharon Plummer, a Geriatric Nurse Practitioner will continue to work with Dr. Albert to provide high-quality foot care; Marla Bernbaum, M.D., will continue to provide quality education for residents and special insights into the care of patients with diabetes.

Overall, we believe that this synergy will demonstrate the “power of one,” which will lead to our ability to recruit an outstanding leader to replace Dr. Mooradian as the Chief of Endocrinology at Saint Louis University.
The term osteoporosis was originally used by Johann Lobstein in the early 19th century. In 1940, Fuller Albright felt that estrogen deficiency at the time of the menopause played a role in the development of osteoporosis. It is now recognized that osteoporosis has many causes, including sex hormone deficiency in both men and women, alterations in vitamin D metabolism, excess cytokine production associated with infection and other diseases, medications, abnormalities of collagen, and alterations in osteoblast maturation such as abnormalities of the Wnt-LRP5 receptor or excess production of sclerostin. The multiple advances in our understanding and treatment of osteoporosis have led us to produce an osteoporosis update as our centerpiece for this issue of Aging Successfully.

The diagnosis of osteoporosis is now made by the presence of a bone mineral density which is more than 2.5 standard deviations below the mean for a young adult. Osteopenia is present when the T-score is between -1 to -2.5. All persons with fragility fractures (Colles (wrist), vertebral, or hip) should be treated for osteoporosis. In the United States, there are one and a half million osteoporotic fractures every year which cost the health care system $18 billion. It has been shown that physicians often fail to recognize and treat osteoporosis.

Osteoporosis is considered to be a pediatric disorder because the size of bones is determined by the time a person reaches adolescence. Increasing calcium intake before the teenage years increases bone mineral density.

The foods pictured on this page are rich in calcium and making them part of your diet will help prevent osteoporosis.

Several current treatment options are shown on pages 12-13, but the latest new treatment on the horizon for osteoporosis is Denosumab (RANKL antibody). While still in animal trials, this promising experimental medication for the treatment of osteoporosis, RANKL, is a member of the tumor necrosis factor superfamily of ligands and receptors, which promotes the differentiation, activation, and survival of bone-resorbing osteoclasts. Osteoprotegerin (OPG), which is produced by osteoblasts, is the key modulator of RANKL. It acts as a natural soluble decoy receptor for RANKL and blocks its effects. Denosumab functions like OPG and has the effect of decreasing osteoclastogenesis, as revealed by diminished biochemical markers of bone resorption.
Production of Bone Cells

- Hemapoietic Stem Cell
- Mesenchymal Stem Cell
- PTH
- VDR
- Estrogen
- Testosterone
- Inhibits adipocyte and chondrocyte differentiation
- Osteoblast Precursor
- OPG
- RANK
- RANKL
- BMP
- Osteocalcin
- IGF-1
- SOST
- WNT
- LRP
- Osteoclast
- Osteoblasts
- Osteocyte
- Osteoclasts
- Sclerostin
- Osteoblasts produce mineralization
- Osteoblasts become lining cells
- Decline of bone mineral density with age
- Normal bone (left) contrasted with altered bone structure in osteoporosis (right)

Bone Remodeling Unit

Development of Osteoporosis

Bone Mineral Density test report
Decline of bone mineral density with age

Lining Cells
Dkk
Pre-osteoclasts
M-CSF
Pre-osteoclasts
M-CSF
Pre-osteoclasts
M-CSF
Pre-osteoclasts
M-CSF
Pre-osteoclasts
M-CSF

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**Management of Osteoporosis and Fractures**

### Prevention
- Calcium (1 to 1½ g) daily
- Vitamin D (800 IU daily)
- Exercise
- Do not smoke
- Avoid falls
  - Sensible shoes
  - Balance exercises
  - Remove environmental hazards
- Hip protectors
- Estrogen (females) / Testosterone (males)
- Selective estrogen receptor modulators
  - Raloxifene
  - Tamoxifen

### Medications
- Bisphosphonates
  - Weekly:
    - Alendronate
    - Risedronate
  - Monthly:
    - Ibandronate
- Calcitonin
- Parathyroid hormone analog
- Experimental
  - Strontium ranelate
  - Denosumab (antibodies to RANKL)
- Non-Medication:
  - Kyphoplasty
  - Vertebroplasty

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### Risk Factors for Osteoporosis
- Low calcium intake
- Seizure medications (anticonvulsants)
- Thin build
- Ethanol (excess alcohol)
- Hypogonadism (female and male)
- Prior fracture
- Thyroid excess
- Race (Caucasian/Asian)
- Other relatives with osteoporosis/fractures
- Steroids
- Inactivity
- Smoking

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Pope John Paul II had osteoporosis and suffered a hip fracture.
Saint Louis University Names New Dean for School of Public Health

A California professor with extensive experience working with hospitals, health systems and public health agencies will become dean of the Saint Louis University School (SLU) of Public Health this summer. Connie Evashwick, Sc.D, currently is professor of health care administration at California State University, Long Beach. She joins SLU on July 1.

“Connie has impeccable credentials and a national academic reputation in the area of long-term care,” said Joseph Weixlmann, Ph.D, provost of Saint Louis University. “Her distinguished professional career and strong leadership credentials make her a superb choice to lead our School of Public Health.”

Dr. Evashwick earned doctorate and master’s degrees from Harvard School of Public Health, and has master’s and bachelor’s degrees from Stanford University. Her area of expertise is the continuum of care and long-term care health delivery systems. She had been Endowed Chair and Director of the Center for Health Care Innovation at California State University, Long Beach. She has combined her academic career with consulting and direct operations management. Dr. Evashwick has served as vice president of long-term care for two major health care systems and is a national consultant to health systems, hospitals and long-term care organizations.

“I am delighted to be coming to a university that has such an outstanding, nationally-recognized division of geriatric medicine! I first met Dr. Morley over twenty years ago when we were both working in Los Angeles. He was impressive even then! I am eager to re-connect with Dr. Morley and to meet his colleagues and students. I look forward to opportunities to connect public health and aging initiatives--two vital areas that can create successes through synergy!” Dr. Evashwick said.

Dr. Evashwick is the author or editor of 12 books and more than 100 other publications. She has been active in professional societies in the health administration and aging fields, including being a Regent and Fellow of the American College of Healthcare Executives and chair of the Gerontological Health Section of the American Public Health Association.

Homer Schmitz, Ph.D., a professor of health administration in the School of Public Health and member of the Saint Louis University faculty for 29 years, has served as interim dean. He will return to his faculty position when Dr. Evashwick joins the University this summer.
Diseases related to crystal formation (krystiatrics) are all around us. Osteoporosis, for example, is a disease where too few crystals containing calcium and phosphorus are present to maintain bone strength. According to the most recent studies, osteoporosis affects 55 percent of the people 50 years of age and older. One in two women and one in four men over age 50 will have an osteoporosis-related fracture in her/his remaining lifetime. Vitamin D, a hormone critical to the formation of calcium and phosphorus crystals, is a focus of the research in the Division of Endocrinology. Part of the treatment of osteoporosis, in addition to fall prevention, is based on dietary changes and medications that foster the formation of new crystals and the prevention of crystal loss.

The most common cause of tooth loss is periodontal disease. This problem of the jawbone causes loss of the crystals surrounding the teeth, resulting in the loss of attachment. Continued loss of bone tissue from the jawbone after teeth have been removed complicates the proper fit of dentures. This problem can result in undernutrition. Medication that is used to treat bone loss in osteoporosis is currently under study to evaluate its effect on bone loss of the jaw bone. Scientists at the Center for Advanced Dental Education of Saint Louis University, the Division of Endocrinology in the Department of Internal Medicine, and the Southern Illinois University School of Dentistry, in collaboration with Mallinkrodt Institute of Radiology at Washington University, continue to look at ways to evaluate the tissues that hold our teeth in place.

Crystal-related diseases may also get in the way of normal functions. For example, otosclerosis, the most common form of hearing loss, is caused by the overgrowth of bone in the middle ear. Hearing becomes more difficult because of the change in the small bones that conduct sound waves. Investigators at Saint Louis University School of Medicine Department of Otolaryngology and the Division of Endocrinology are looking at the potential link between osteoporosis and otosclerosis. Crystal-related diseases have long been known to cause kidney stones. Our evaluation of these conditions focuses on dietary and medication treatment strategies to avoid future kidney stones. Sometimes surgery is unavoidable to preserve kidney function and reduce pain. More recently, studies have shown that calcium crystals may form on heart valves and vessels that carry blood. The amount of calcium seen in a vessel seems to reflect a higher risk of heart disease. Patients with higher risk of heart disease, such as those with chronic kidney disease or diabetes, also have more crystals in the arteries. Diets high in cholesterol seem to increase the chance of calcium in the artery as well. Another focus of investigation in our Division is to determine what the link is between crystals in the vessel, high cholesterol and the risk of future heart disease.

Crystal-related diseases have long been known to cause kidney stones. Our evaluation of these conditions focuses on dietary and medication treatment strategies to avoid future kidney stones. Sometimes surgery is unavoidable to preserve kidney function and reduce pain. More recently, studies have shown that calcium crystals may form on heart valves and vessels that carry blood. The amount of calcium seen in a vessel seems to reflect a higher risk of heart disease. Patients with higher risk of heart disease, such as those with chronic kidney disease or diabetes, also have more crystals in the arteries. Diets high in cholesterol seem to increase the chance of calcium in the artery as well. Another focus of investigation in our Division is to determine what the link is between crystals in the vessel, high cholesterol and the risk of future heart disease.

You may reach a specialist in Krystiatrics (Krystiatrician) in the Division of Endocrinology at Saint Louis University School of Medicine by calling 866-977-4440.
Should I fuel my engines with Testosterone?

“Oh Venus, cruel mother of amorous designs, cease attempting to bring under your yoke a man now arrived at his fiftieth year, and therefore stubborn to submit to your voluptuous commands.”

Horace 65-68 BC

The concept of a male menopause was first recognized in the Chinese Text of Internal Medicine. However, it was the self-injections of a testicular extract by Brown-Sequard in the late 1880s that began to establish the mythology of youth. Based on his experiments, Brown-Sequard concluded that “the question is certainly not whether the injections rejuvenate, the question is to know if one can approximate the strength of a younger person and to me that appears certain.” His concepts rapidly spread to the United States where the first human-to-human testicular transplant was carried out at the University of Chicago. The shortage of available donors of human testes led Serge Voronoff to develop “monkey-gland” transplants. He developed one of the first “anti-aging clinics” on the Italian Riviera, where he transplanted chimpanzee testicles into the aging rich of Europe. Leo Brinkley in the United States became famous for transplanting goat testes into the aging rich of America. In the 1930s, testosterone was isolated from bull testicles and the field of testosterone replacement began to move from blatant quackery to having a scientific base.

It is now well accepted that testosterone levels decline with aging at the rate of approximately 1% per year from thirty years of age. In addition, sex hormone binding globulin, which binds testosterone, making it unavailable to tissues, increases with aging. Thus, there is an even greater decrease in tissue-available (bioavailable) testosterone with aging. As the symptoms of male hypogonadism are similar to those of aging, there have been a number of attempts to examine the effects of testosterone deficiency as a cause of aging.

Testosterone replacement has been shown to increase libido and enhance erectile function (including in persons taking phosphodiesterase-5 inhibitors such as Viagra and Cialis), decrease fat mass, increase muscle mass, strength, and bone mineral density, and increase hematocrit (see figure above) (9). In addition, testosterone improves visual-spatial memory. In patients with Alzheimer’s disease, there is evidence that low testosterone is predictive of future disease and some small studies have suggested improvement in some aspects of memory in patients with Al-
Impairment in the biochemical responses to thyroid hormone in older animals. However, present data does not support the replacement of thyroid hormone in older persons who are euthyroid. Approximately 5% of persons over the age of 80 years are hypothyroid. Thus it is appropriate to regularly screen for elevated TSH levels in older persons.

**Conclusion**

The concept of a hormonal fountain of youth is clearly not a sustainable one. While many older persons develop hormone deficiencies and clearly require hormone replacement to treat these disorders, there is little evidence to support the concept of universal hormone replacement in older persons. There is, in fact, some evidence that the physiological fall in hormone levels with aging may play a protective role. The exception is the case of vitamin D where most older persons benefit from replacement with 800IU of 25(OH)_2 vitamin D daily. In symptomatic older males with hypogonadism, testosterone may improve their enjoyment of life. The use of melatonin or its receptor agonist, remelteon, may be a safe approach to decreasing sleep latency in older persons with insomnia.

**References**

A Trip Down “Memory” Lane

Alzheimer’s Disease does not discriminate among its victims. From the 90 year-old woman sitting in solitude in a nursing home in Topeka, Kansas, to the 40th President of the United States - no one can predict who will be vulnerable to the ravages of Alzheimer’s disease.

Famous people - from athletes to actors to authors, from political figures to performers to producers - who suffer from Alzheimer’s disease serve to remind us that there is currently no prevention, and no cure. This disease makes it difficult, if not impossible, for victims to make public appearances or speeches, and so, it is only their premature silence that alerts the public to their plight.

Several Hollywood cultural icons including Rita Hayworth and Charles Bronson, boxer Sugar Ray Robinson, and singer Perry Como suffered from Alzheimer’s disease. Because they were diagnosed late in the disease’s progression, their illness was not well publicized and little attention was directed to research at that time. Charlton Heston is one celebrity currently suffering with Alzheimer’s disease.

Ronald Reagan, perhaps the most well-known Alzheimer’s patient, founded the Ronald and Nancy Reagan Research Institute in coordination with the Alzheimer’s Association to explore possible causes and treatments, focusing on early detection. When he died in 2004, he left a legacy of research funds to benefit a country that now better understands and appreciates this tragic condition.

Geriatricians are trained to detect the early stages of mild cognitive impairment and Alzheimer’s disease. Adults over 70 years of age should have at least one full geriatric assessment every five years. More frequent assessments should occur if one is concerned about Alzheimer’s disease.
SLU Holds Seventeenth Annual Summer Geriatric Institute

Two hundred and fifty nurses, physicians, therapists, educators, social workers, researchers, and clergy attended the Seventeenth Annual Saint Louis University Summer Geriatric Institute: Caring for the Vulnerable on June 6-7, 2006. Among the topics discussed were cultural transformation in nursing homes, the development of research projects on caregivers, appetite assessment, dental care in the nursing home, emergency preparedness, delirium, depression, palliative care, anemia, and cochlear implants.

Two special lectures were the James Flood Memorial Lecture: Therapeutic Strategies in Alzheimer’s Disease which was given by Claudio Soto, Ph.D., Director of the Mitchell Center for Alzheimer’s Disease Research at the University of Texas Medical Branch in Galveston, Texas. The Max K. Horwitt Memorial Lecture: Nutrition for a Healthy Old Age: The Benefits and Risks of “Health-Promoting” Diets and Supplements was given by Connie W. Bales, Ph.D., R.D., Associate Director of Education and Research, GRECC, Durham Veteran’s Affairs Medical Center and Senior Fellow at the Center for the Study of Aging, Duke University Medical Center in Durham, North Carolina.

Connie Bales, PhD, (center) is presented with the Max K. Horwitt Award for her presentation entitled, “Nutrition for a Healthy Old Age: The Benefits and Risks of ‘Health-Promoting’ Diets and Supplements.” Presenting the award is Dr. John Morley as Dr. Nina Tumosa looks on.

Claudio Soto, PhD, (center) is presented with the James Flood Award for his presentation entitled, “Therapeutic Strategies in Alzheimer’s Disease.” Dr. Morley (left) presented the award. Also pictured is Dr. William A. Banks (right).

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**CORRECTION**

from Vol. XVI, No. 2, page 8

### Comparison of Erythropoietin and Darbepoetin

<table>
<thead>
<tr>
<th></th>
<th>Erythropoietin</th>
<th>Darbepoetin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>30,400d</td>
<td>37,000d</td>
</tr>
<tr>
<td>Sialic Acid</td>
<td>Less</td>
<td>Increased</td>
</tr>
<tr>
<td>Half Life (hours)</td>
<td>24</td>
<td>49</td>
</tr>
<tr>
<td>Dose Adjustment</td>
<td>Every 2-4 weeks</td>
<td>Monthly</td>
</tr>
</tbody>
</table>

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**Save This Date!**

**MARCH 12-13, 2007**

**Diabetes and Endocrinology Symposium at Saint Louis University**

Look for more information on this conference in the next issue of Aging Successfully!
to spread freedom. We have an obligation to feed the hungry.” Despite this, we spend only 0.15% of our Gross Domestic Product on foreign aid. This is far below the amount we agreed to spend as part of the Millennium Development Goal. It is sobering to contemplate that 69 days less of war a year would eradicate extreme poverty world-wide. The Commission on Macroeconomics and Health in 2002 stated “Extending the coverage of crucial health services, including a relatively small number of specific interventions, to the world’s poor could save millions of lives each year, reduce poverty, spur economic development, and promote global security.” An additional $31 billion per year in donor assistance for health could avert 8 million deaths a year with economic benefits of $300 billion annually by 2015. Easily obtainable global health solutions are provided in the box below.

Dr. Morley strongly decried the increasing level of ageism seen in the United States. He found it frightening that this postulate is occurring in the year that the first of the baby boomers are turning sixty. As an example, he cited the loss of funding for geriatric education that occurred recently.

In conclusion, Dr. Morley stressed that the students in his audience were expected to become our future leaders. In the Jesuit tradition, it was hoped that as they went forward to the many pinnacles they would successfully climb in their life that these students would carry with them the principle of agape and thus their achievements would lead to a kinder and gentler world. He stressed that in a time of globalization, we all had a responsibility, not only for our family and our own people, but to all citizens of the world.

In conclusion, he shared with them this part of Pope Benedicts XVI’s 2005 Christmas prayer:

“Show us Jesus.
Lead us to Him
Teach us to know and love Him
So that we too can become capable of true love
And be fountains of living water
In the midst of a thirsting world.”

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While you're there, check out the screening tools, links to other useful sites, and information about our upcoming conferences.

SERVICES

Services of the Division of Geriatric Medicine at Saint Louis University Medical Center include clinics at two locations in the following areas:

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- Bone Metabolism
- Falls: Assessment and Prevention
- General Geriatric Assessment
- Geriatric Diabetes
- Medication Reduction
- Menopause
- Nutrition
- Podiatry
- Rheumatology
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- Urinary Incontinence

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Myra Belgeri, PharmD, assistant professor of Pharmacy Practice, has been chosen as one of four recipients of the Fourth Annual hhc (human health care) Pharmacy Recognition Award. The award, which is sponsored by Eisai Inc., and U.S. Pharmacist journal, acknowledges pharmacists who provide professional services to people affected by Alzheimer’s disease by implementing programs to address issues such as early recognition, appropriate treatment, and family caregiving.

The awards are intended for licensed pharmacists practicing in a variety of settings who have been involved in education or disease state management of patients with Alzheimer’s disease within the past 12 months.

Belgeri, PharmD, CGP, CPS, FASCP, was recognized with an Institutional Pharmacy award. She serves as an ambulatory care clinical pharmacist with a specialty in geriatrics at the St. Louis Veterans Administration Medical Center. Approximately 30 to 40 percent of the patients Belgeri sees have been identified as having some form of dementia. To address the condition, she has implemented programs that use multiple cognitive screening tools to identify patients with Alzheimer’s and other dementia-related conditions. Belgeri also performs medication reconciliation and medication education at the VA site.

In addition to receiving a commemorative plaque and a $2,500 honorarium, Belgeri also will be profiled in a two-page article in a third-quarter issue of U.S. Pharmacist. She was nominated for the award by the American Society of Health System Pharmacists.

Deborah S. Manne, RDH, RN, MSN, OCN, Adjunct Instructor, Division of Geriatric Medicine, and Clinical Nurse/Research Coordinator/Dental Hygienist for Dr. Mark Varvares and Dr. Michael Odell in the Department of Otolaryngology-Head and Neck Surgery, received the Alfred C. Fones Award on Saturday June 24, 2006 at the American Dental Hygienists’ Association’s Annual Session held in Orlando, Florida. This award is one of the highest awards given to a registered dental hygienist in the US by this organization and is given in recognition of exceptional service and contributions to patient care and the dental hygiene profession. Deborah had already received the Irene Newman Professional Achievement Award, which is the second highest award given to a dental hygienist, in June 1997.

Margaret M.G. Wilson, MD, has been chosen from 200 nominees to receive a 2006 Saint Louis University Faculty Excellence Award. This annual award recognizes those faculty members who have greatly impacted the lives of SLU students and who demonstrate excellence both inside and outside of the classroom.
Upcoming Continuing Education Programs

The Eighteenth Annual
Saint Louis University
Symposium for Medical Directors
and the 26th Annual
GRECC
Conference
December 9, 2006
St. Louis, Missouri USA

The Sixth World Congress
The Aging Male
2008
Tampa Bay, Florida, USA

The Fifteenth Annual
Multidisciplinary
Certificate Program in
Geriatrics for
Non-Physicians
Wednesdays
Sept. 13, 27, Oct.11, 25,
Nov. 8, 29, 2006
Orland Park, Illinois
Fridays
Sept. 8, 22, Oct. 6, 20,
Nov. 3, 17, 2006
Galesburg, Illinois

The Fourth Annual
Western Missouri
Geriatric Research,
Education, and Clinical
Center (GRECC)
Symposium
November 9, 2006
Kansas City, Missouri

The Fourth International
Academy
Nutrition and
Aging
September 5-6, 2007
Adelaide, Australia

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