Testimony of Linn Goldberg, M.D., F.A.C.S.M. U.S. House of Representatives Committee on Oversight and Government Reform "HGH Testing in the NFL" Washington, D.C. 20515-6413 December 12, 2012

Mr. Chairman and Committee members:

Thank you for inviting me to this hearing concerned with Human Growth Hormone (hGH) testing within the National Football League. I am a practicing physician, Professor of Medicine and Head of the Division of Health Promotion & Sports Medicine at the Oregon Health & Science University. I, along with colleagues, co-developed two evidence-based health promotion and drug prevention programs for teen athletes: ATLAS for males, and ATHENA for females (1-5). I was the principal investigator of the SATURN study, the first NIDA funded drug-testing study of high school athletes (6). In addition, I co-edit the Endocrine Society's Hormone Foundation website concerned with both anabolic steroid and hGH use and abuse and am a former U.S. Olympic Committee Crew Chief and Doping Control Officer for the United States Anti-Doping Agency.

This is the third time I have testified to the House of Representatives concerning use performance enhancing drugs (PEDs). I would like to focus much of my testimony on high school athletes' use of PEDs, and comment on the potential impact a "robust HGH testing program in professional sports," as described in the letter requesting my testimony.

Adolescent athletes and performance enhancing drugs

More than 55% of high school students participate in school-sponsored sports. While both young male and female athletes report use performance enhancing drugs, there are unique, sex-specific reasons for use, thus requiring a different prevention approach. Some use these substances because of 1) social pressures; 2) to enhance athletic performance; 3) improve their body image; 4) impulsivity and risk-taking (especially young males); 6) depression and disordered eating practices (especially young women); and 7) modeling use by older, accomplished athletes. Teen performance-enhancing drug users are more likely to use alcohol and other drugs (8), thus performance enhancing drug prevention should target other substances of abuse, as well.

Unfortunately, no national data estimates include the use of human growth hormone among adolescents. One report published twenty years ago suggested 5% of high school athletes had used hGH during their lifetime (9). However, In our study of over 3200 male high school football players, less than 1% reported using hGH (1,2).

The laboratory derived human growth hormone sold commercially has eliminated

a once critical risk that existed when cadaver pituitary glands were used as the source of hGH, when some developed a devastating degenerative brain disease known as Creutzfeldt–Jakob, due to a virus found in some hormone samples (10). HGH has been on the list of forbidden substances in collegiate, professional sports, and banned from Olympics since 1989.

Use of physiological doses of rhGH has been shown to be relatively safe and can increase in bone mass, lower body fat, enhance growth rate and muscle mass and improve cholesterol levels among children with a growth hormone deficiency (11,12). However, athletes use recombinant (rhGH) at higher doses than amounts used to replace normal growth hormone production (13). Although the ability to enhance athletic abilities is not proven (8), many athletes believe rhGH works, and use it alone or in combination with other drugs (14,15).

Potential risks of human growth hormone use

Like any injectable drug, if vials or needles are shared, there is a risk of disease transmission of HIV, hepatitis or other infections. Also, since a prescription is needed, those who may sell the drug on the "black market" or buying what they believe to be human growth hormone from a website, may be getting something other than rhGH, with potential impurities.

Although long-term risks of high dose rhGH have not been studied, pituitary tumors producing high levels of hGH can cause the disease, acromegaly. This is a potential model of the hormone's long-term toxicity. Signs of acromegaly include enlargement and broadening of facial features and a protruding jaw, features present in the French born professional wrester Maurice Tillet, who some believe was the inspiration for the appearance of the cartoon character, Shrek. There can be swelling of the limbs, joint pains, and an increased risk of developing diabetes, high blood pressure, and premature cardiovascular disease. Over years, peripheral nerve damage and muscle weakening can occur.

Athlete drug testing

The primary aim of drug use in collegiate, professional and Olympic sport is to identify the user and remove them from competition or sanction the athlete and expunge their record. This contributes to fairness in sports, by eliminating the advantage performance enhancing drugs.

Reasons to drug test at the youth athlete level may be somewhat different. Among those in middle and high school, drug testing has been used in an attempt to 1) prevent use and potential harm of drugs, 2) identify early abuse or addiction and 3) to identify and provide treatment. In addition it may lead to fair competition. Although some states have tested for anabolic-androgenic steroids (AAS), most high school athletes subject to drug testing are not being tested for steroids, let alone, hGH. Student athlete drug testing most often includes a group of illicit drugs, such as marijuana, phencyclidine, cocaine and opiates, while other substances of abuse, such as club drugs or alcohol are not regularly assessed.

Does drug testing prevent drug use, even among elite athletes?

Despite the best efforts sports' drug testing policies, a number of high profile athletes have never failed a test, yet have been identified by sports authorities or self-admitted their use of performance enhancing drugs. The use of THG (tetrahydrogestrinone or 'the clear'), is an anabolic steroid created in a laboratory, designed to avoid detection (16). Use was successfully masked until a sample of THG was sent to the Olympic laboratory for analysis and a number of athletes were identified as steroid users when their urine samples were reexamined. For those athletes, drug testing did not deter use, but resulted in searching for methods to beat the test.

No randomized, prospective evaluation of drug testing, has been performed among collegiate, professional or Olympic athletes. Thus the question is, does drug testing at the elite level deter use, or just reveal use? If drug testing were a strong deterrent to an athlete's drug use, one would suspect there would be few, if any positive tests because the policy would prevent use. If drug testing deterred but did not eliminate performance enhancing or other drug use, we might expect fewer positive tests the longer a drug-testing program was in place, as identification of drug positive athletes would discourage others from using. However, the data does not provide much evidence of a strong deterrent.

- Anabolic steroid testing has been in the Olympics since 1976, yet positive drug tests occur prior to and during every Olympics. During the six months prior to the 2012 London Olympics, 117 athletes received sanctions for drug offenses and nine additional positive drug tests occurred during the 'Games' (17).
- Major League Baseball drug suspensions in 2012 were the most since 2007 (18).
- National Football League testing reported 21 tests positive for performance enhancing drugs in 2012, which is a 75% increase over the 12 suspensions issued last year (19).
- The World Anti-Doping Agency's drug testing data reports a reduction in 15,000 tests from 2010 to 2011. Despite fewer tests during 2011, the percentage of overall "Adverse Analytical Findings," were the highest since 2008 (20).
- For the combined years of 2007 and 2008, USADA performed 17,133 tests of which 44 were positive. During the subsequent two years of 2009 and 2010, USADA performed 5% less tests yet positive tests increased 54% (21).

Thus, recent WADA, USADA, MLB and NFL data suggest a higher percentage of athletes using drugs who are subject to testing. Although this also implies that drug testing policies may be improving and keeping the competition cleaner, they do not support a strong drug prevention component of testing by itself. Rather than send a message that human growth hormone testing or any other drug is not tolerated because there is testing in elite sports, the message may be interpreted that "the professionals they admire" use or have used hGH to achieve

their elite status and drug testing is needed in order to keep them honest.

Drug testing and high school athletes

The first-ever drug testing study of high school athletes, funded by the National Institute on Drug Abuse, entitled SATURN (Student Athlete Testing Using Random Notification) (6), was a suspicionless, no-advance warning program to I helped design, to mirror elite athlete programs. Testing was in and out of season, and steroids and alcohol tests were included. After two years, no drug or alcohol deterrent effects were present for past month use at any of the four follow-up periods. In addition, athletes at testing schools, had an increase in risk factors for future substance use. Although a U.S. Department of Education (DOE) one-year study of student drug testing found some reductions in drug use, there were no spillover prevention effects among other students not subject to testing (22). Unlike SATURN, the DOE study could not track students, thus the reduction in reported drug use, may have been an artifact of their volunteer sample from pre to post testing. In the largest epidemiological national study of school drug testing performed by the staff at Monitoring the Future at the University of Michigan (23), investigators found drug testing not to be associated with students' reported illicit drug use; and drug testing of athletes was not associated with lower illicit drug use among male high school athletes.

What about the penalties for college players who test positive during their tryouts for the NFL?

The reason given for avoiding drug use in elite sport is sanctions, loss of earning power and the shame of being recognized as a drug user. At the invitation-only NFL Scouting Combine, college football players perform physical and mental tests and drug tests are administered. When I last testified to this committee in 2005, a Northwestern University football player tested positive for anabolic steroids at the NFL Scouting Combine (24). Despite using steroids, this athlete was drafted by the San Diego Chargers in the first round of the 2005 NFL Draft. During the most recent 2012 Scouting Combine, several college players tested positive for drugs. Three prominent athletes testing positive for drugs are playing in the National Football League (25). What message does this send to collegiate and high school athletes about toleration of their drug use?

What has not worked in drug prevention?

Effective drug prevention principles are based on decades of study, determining how drug abuse starts and how it progresses (26). The types of interventions without proof of evidence of effectiveness include:

- <u>Use of fear arousal or "scare tactics," only emphasizing the negative</u> <u>effects of drugs</u>. Among male athletes, this resulted in an increase desire to use anabolic steroids (27).
- <u>Use of national media campaigns</u>. The GAO report found that not only was ONDCP's 1.2 billion dollar "Youth Anti-Drug Media Campaign" was not only ineffective, but it may have increased marijuana initiation among some youth (28). Another analysis, confirmed the ineffectiveness of

ONDCP's media campaign (29).

- <u>Student-athlete drug testing</u> (6,23).
- <u>Knowledge only approaches</u> (explaining risks and benefits of PEDs (30)
- Pamphlets or written materials, only (30)

Successful Prevention of Performance Enhancing Drugs

I, along with my colleagues, at the Oregon Health & Science University and Arizona State University, developed performance and body shaping drug prevention programs tailored to adolescent male and female athletes risk and protective factors, involving over 4,000 high school athletes (1-5). ATLAS, for high school male athletes and ATHENA for high school female athletes are multicomponent programs that are peer-led in small groups of approximately 5 athletes within a team structure. The programs feature positive peer pressure and promote healthy role modeling. Students learn why and how to counter drug offers, including use of steroids, growth hormone and other drugs. Sports nutrition and strength training techniques, were used to naturally enhance athletic abilities. These sport team-centered programs were found to do the following, as compared to control schools:

After ATLAS (1) athletes reported;

- 50% decrease in new anabolic steroid use
- 50% reduction in new alcohol and illicit substance use
- 50% lowering of sport supplement use
- 24% decline in drinking and driving occurrences
- Improved nutrition and exercise behaviors
- Reduced desire to use steroids
- The belief they were better athletes

After ATHENA athletes reported;

- Less use of athletic enhancing substances (steroids, amphetamines, supplements)
- Less use of diet pills
- Less riding in a car with a drinking driver
- Greater seatbelt use
- Reduced sexual activity
- Improved nutrition behaviors
- Reduced long-term use of alcohol, marijuana and tobacco

After reviewing the scientific evidence, a 2007 GAO report (31) reported: "assessments of the ATLAS and ATHENA prevention programs and in general suggested that the programs may reduce abuse of anabolic steroids and other drugs among high school athletes immediately following participation in the programs." The World Anti-Doping Agency's sponsored evaluations of worldwide anti-doping programs (32,33) reported that ATLAS and ATHENA "provide the only high quality evidence available on the best way to educate adolescents about doping." ATLAS and ATHENA are listed in the U.S. Department of Health & Human Services' National Registry of Evidence-Based Programs and listed as evidence-based by other federal departments.

ATLAS and ATHENA have been disseminated to more than 80,000 young athletes in the United States during the past 6 years, spearheaded by the National Football League's Youth Football Fund, Sports Illustrated the National Football League's Youth Football Fund, the Hanley Center in Florida, the Professional Baseball Strength & Conditioning Coaches Society, and other foundations. However, there are over 7.5 million high school athletes in the United States, with an additional 2 million entering sports programs each year. If Congress thinks prevention of performance enhancing drugs among our nation's youth is important, it should go beyond support of testing professional athletes.

In 2004, Congress passed the Anabolic Steroid Control Act, to eliminate prohormone steroids sold over-the-counter, making them a schedule III drug of the Controlled Substances Act (34). The Act authorized \$90 million, or \$15 million per year to the Department of Health & Human Services for "...science-based education programs in elementary and secondary schools..." to prevent steroid use. Because Congress did not appropriate funding over subsequent years, in 2009, the last year of the Act's educational fund authorization, the National Football League, Major League Baseball, United States Anti-Doping Agency, United States Olympic Committee and the National Federation of State High Schools sent letters to all members of Congress, requesting funds to educate children and adolescents about steroids. No funds were appropriated. However, since that time there have been two high profile steroid court cases, costing the government millions of dollars in a failed attempt to convict two Major League Baseball players.

The CDC estimates (35) over 500,00 high school students report using anabolic steroids and it is likely these and other students have tried human growth hormone and other PEDs. This level of use is more than all the players in the NFL, NBA, NHL and MLB combined, multiplied by over 100. If the NFL does effective rhGH testing, it may improve fairness in professional football. However, effective youth programs are needed to help ensure that young athletes have the tools to resist performance enhancing drugs and hormones in order that sports promote safety, health and fairness. That is the message Congress could send.

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Linn Goldberg, M.D., F.A.C.S.M. Professor of Medicine Head, Division of Health Promotion & Sports Medicine Oregon Health & Science University

Dr. Linn Goldberg is Professor of Medicine and Chief of the Division of Health Promotion and Sports Medicine at the Oregon Health & Science University (OHSU), a division he co-developed. Dr. Goldberg directs OHSU's Human Performance Laboratory, a state-ofthe-art facility he created more than 25 years ago, dedicated to researching, diagnosing, and treating medical illnesses that impair physical activity. He is an educator, scientist, and developer of innovative health promotion programs that have been recognized both nationally and internationally. He has been an Olympic Crew Chief and a United States Anti-Doping Agency Doping Control Officer. Dr. Goldberg was Principal Investigator of the SATURN (Student Athlete Testing Using Random Notification) study; the first-ever National Institute on Drug Abuse supported investigation of the effects of drug testing's among high school athletes. Dr. Goldberg has been a member of the Endocrine Society's Hormone Foundation and co-edits the Foundation's anabolic steroid and Human Growth Hormone web pages concerned with hormone abuse.

He has published cutting-edge research and developed evidence-based programs that have affected the lives of tens of thousands of children and adults throughout the United States. He has been awarded 41 grants and contracts of more than \$38 million to support his programs' research, development, and dissemination. Dr. Goldberg has twice provided invited testimony before Congress, served as an expert panelist for the U.S. Department of Education, and consulted with numerous scientific societies, federal and state agencies, and the White House.

Dr. Goldberg has delivered more than 240 national and international presentations and authored more than 240 scientific publications. He co-edited the first volume of the *Medical Clinics of North America* dealing with exercise benefits (*Medical Aspects of Exercise*), co-authored a preeminent medical textbook, *Exercise for Prevention & Treatment of Illness*, and the highly regarded lay book, *The Healing Power of Exercise*, explaining how to prevent and treat common medical problems through physical activity.

Dr. Goldberg's scientific advancements concerning physical activity and nutrition are extensive and span from publishing the first study demonstrating cholesterol level improvement after strength training in the 1984 Olympic Edition of the *Journal of the American Medical Association (JAMA*), to the 2010 *New England Journal of Medicine* report of the HEALTHY trial, as one of its seven principal investigators. This multi-site National Institutes of Health funded study involving 6,000 middle school students, illustrated how peer educators, team-based health classes, and revamped food service and PE instruction can reduce childhood obesity, providing a new model for health promotion in our nation's schools. Additionally, Dr. Goldberg co-developed the National Cancer Institute-funded PHLAME firefighter wellness program. This team-centered exercise and nutrition intervention reduced medical costs and work-related injuries and is now disseminated to firefighters throughout the U.S. Recently, Dr. Goldberg developed the Healthy Team Healthy U wellness program for OHSU's more than 12,000 employees.

Dr. Goldberg's development of NIDA supported programs for teenage athletes (ATLAS for boys and ATHENA for girls) use of physical activity, healthy nutrition and athletic achievement as alternatives to performance enhancing and illicit drug use and other health harming behaviors is regarded as the 'gold standard' for young athletes' health promotion. These NIH-studied programs were proven to be effective with 4,000 participants in 49 high schools, using student-athlete peer leaders to educate their teammates in small groups. Dr. Goldberg has since expanded these programs' use to more than 80,000 high school athletes and their coaches in 45 states and the District of Columbia by securing funding from the National Football League, *Sports Illustrated*, community groups and private foundations. These programs use sport teams as ideal settings to promote healthy lifestyles and in doing so helping recapture the health-enhancing mission of sport.

ATLAS and ATHENA have been lauded by the National Institutes on Drug Abuse (NIDA), the U.S. Congress, the Federal Interagency Working Groups on Youth Programs, the U.S. Department of Health & Human Services (Model Program Award), and the U.S. Department of Education (Exemplary Program Award), Office of Juvenile Justice (Model Program Award). As a U.S. Senator, Vice President Joe Biden identified ATLAS and ATHENA as the health promotion models of his federal legislation, the "Anabolic Steroid Control Act of 2004," and he joined Sports Illustrated Senator John McCain, Representative Tom Davis and former Secretary of the Department of Education, Margaret Spellings in presenting Dr. Goldberg with the "Champion Award" for his work. In 2010, Sweden's Queen Silvia honored Dr. Goldberg with the Mentor International Achievement Award for development and dissemination of ATLAS and ATHENA and in May 2012, Dr. Goldberg received the Lifetime Achievement Award from the President's Council on Physical Fitness, Sports and Nutrition. His work has appeared in major media, including NBC Nightly News, ABC's Good Morning America, NBC's Today Show, CNN, ESPN, PBS, NPR, the New York Times, Chicago Tribune. Washington Post, USA-Today, and Los Angeles Times, among others.

Committee on Oversight and Government Reform Witness Disclosure Requirement – "Truth in Testimony" Required by House Rule XI, Clause 2(g)(5)

Name: Linn Goldberg, M.D.

1. Please list any federal grants or contracts (including subgrants or subcontracts) you have received since October 1, 2010. Include the source and amount of each grant or contract.

 R1010-H009676
SHIELD (Safety and Health Improvement: Enhancing Law Enforcement Departments) Co-Investigator, NIH, 2010-2014; Amount: \$2,268,560
DHS/FEMA
Fire Prevention and Safety Videos for Women with Small Children
Co-Investigator, FEMA 2010-2011; Amount: \$261,316
3.1R41TR000357
Wellness for firefighters: moving an evidence-based program online
Co-Investigator, NIH, 2012-2013; Amount: \$215,012

2. Please list any entity you are testifying on behalf of and briefly describe your relationship with these entities.

3. Please list any federal grants or contracts (including subgrants or subcontracts) received since October 1, 2010, by the entity(ies) you listed above. Include the source and amount of each grant or contract.

I certify that the above information is true and correct. Signature:

Date: 12/7/12