Human Genome Sciences, Inc.
14200 Shady Grove Road
Rockville, MD 20850

Testimony of
James H. Davis, Ph.D.
Executive Vice President and General Counsel
Human Genome Sciences, Inc.
Before the United States House of Representatives
Committee on Homeland Security,
Subcommittee on Emerging Threats, Cyber Security, and
Science and Technology

April 18, 2007

Hearing on "Can BioShield Effectively Procure Medical Countermeasures that Safeguard the Nation?"

Mr. Chairman, members of the Subcommittee, thank you for the invitation to appear before you today on behalf of Human Genome Sciences. I am Dr. Jim Davis, Executive Vice President and General Counsel of Human Genome Sciences (HGS). In this capacity, I have been extensively involved with the business development, regulatory approval process, and federal procurement issues related to the anticipated sale of HGS' innovative therapeutic treatment, ABthrax™, for victims of anthrax exposure. I have been involved with this project since we undertook to develop this product on our own initiative and at our own expense immediately following the anthrax attacks of 2001.

As you know, ABthrax is one of several products that have been procured by the Department of Health and Human Service (HHS) under the Project BioShield Act of 2004. Our initial contract was awarded in September 2005 for purchase of a test quantity of our novel anthrax therapeutic. In June 2006, HHS exercised the first of several options under the contract for delivery of 20,000 doses of ABthrax to the Strategic National Stockpile (SNS), valued at $168 million. We are on track to deliver the product in 2008, subject to approval of the Food and Drug Administration ("FDA"). We have already initiated both human and animal studies and have manufactured the product at scale for those studies. We are confident we have the processes and capability to manufacture the product for the SNS, on schedule. Of course, if HHS elects to exercise the remaining options for delivery of up to 100,000 doses of ABthrax to the SNS, we stand ready, willing, and able to meet that obligation also.

By way of background, HGS is a biopharmaceutical company located in Rockville, Maryland, that discovers, develops and manufactures gene-based drugs to treat and cure disease. Currently, we have six drugs in clinical development, including five monoclonal antibodies, and a broad pipeline of preclinical compounds. These include novel human protein and antibody drugs discovered through our genomics-based research, as well as new, improved, long-acting versions of existing proteins created using our albumin fusion technology.

Let me be clear. The primary focus of HGS has *not* been - nor will it be - the development of drugs to protect against attack by biological and chemical weapons. The principal focus of our company has been, and remains, pursuit of innovative bio-pharma products for the commercial market. We are not a "bio-defense" company as that term has come to be known in the post-9/11

environment. Our business plan, our executives, and our investors do not see the primary focus of HGS, now or in the future, to be the federal marketplace.

For this reason alone, HGS represents, at least in this aspect, the success of Project BioShield. While there is no doubt the program has faced challenges, the fact that HHS was able to attract the participation of a company whose focus has not been - and will not be - the biodefense market demonstrates that the initial objectives of Project Bioshield can be achieved. The background of HGS and ABthrax demonstrates that Project BioShield can succeed, and thus, the procurement of this product must be examined as the program moves forward to address the challenges BioShield has faced, and the potential it holds for the future.

History of ABthrax™

Nearly six years ago, we realized that our company had the technology and capability to develop an effective, near-term countermeasure against one of the nation's most immediate and serious bioterrorism threats – anthrax. As a company headquartered just outside Washington D.C., we witnessed first-hand the potentially devastating effects of the use of anthrax as a terrorist weapon in late 2001. Thus, using our own funds - without any assistance whatsoever from the United States Government - HGS developed a fully human monoclonal antibody drug called ABthrax that specifically binds to a key anthrax toxin, thereby preventing or treating the lethal effects of anthrax infection. The drug can be given prior to or after exposure; and it could be used alone or in conjunction with the current vaccine and antibiotics.

As you know, anthrax infection is caused by a spore-forming bacterium, *Bacillus anthracis,* which multiplies in the body and produces lethal toxins. Most anthrax fatalities are

caused by the irreversible and destructive effects of the anthrax toxins; as we saw in the fall of 2001, survival rates for patients who contracted inhalation anthrax were only 50%. Research has shown that protective antigen is the key facilitator in the progression of anthrax infection at the cellular level. After protective antigen and the other anthrax toxins are produced by the bacteria, protective antigen binds to the anthrax toxin receptor on cell surfaces and forms a protein-receptor complex that makes it possible for the anthrax toxins to enter the cells. HGS' ABthrax antibody blocks the binding of protective antigen to cell surfaces and prevents the anthrax toxins from entering and killing the cells.

Currently, there are only two licensed options available for the prevention and treatment of anthrax infections – the AVA vaccine and antibiotics. Both are essential in dealing with anthrax, but both have limitations for individuals who are suffering from the effects of inhalation anthrax. The only available, licensed anthrax vaccine, BioThrax, coupled with antibiotics, is recommended - but not licensed - for use in a post-exposure setting *prior* to manifestation of symptoms of inhalation anthrax. Antibiotics alone, without the vaccine, are effective in killing anthrax bacteria from spores that have germinated, but are not effective against the anthrax toxins once those toxins have been released into the blood, nor will they kill ungerminated anthrax spores that linger in the bloodstream. Currently available antibiotics, such as Ciprofloxacin, also may not be effective against antibiotic-resistant strains of anthrax. And neither the vaccine nor antibiotics have proven to be effective once symptoms of inhalation anthrax set in.

In ABthrax, HGS has discovered a third critical defense against anthrax infections, including following the manifestation of symptoms. In contrast to the anthrax vaccine, a single dose of ABthrax confers protection immediately following the rapid achievement of appropriate

blood levels of the antibody. In contrast to antibiotics, ABthrax is effective against the lethal toxins released by anthrax bacteria. It may also prevent and treat infections by antibiotic-resistant strains of anthrax. ABthrax has the potential to be used both therapeutically and prophylactically.

In a therapeutic setting and based on initial preclinical studies, we believe that ABthrax could significantly lessen the natural progression of anthrax toxicity when given after inhalation exposure to anthrax and increase the survival of exposed patients. Results from preclinical studies previously conducted demonstrated that a single dose of ABthrax administered therapeutically, after an animal begins to exhibit symptoms of anthrax poisoning, increases survival significantly in rabbits exposed to many times the lethal dose of inhaled anthrax spores.

HGS now has initiated the final pivotal rabbit studies necessary for the approval by FDA under an Experimental Use Authorization and under a Biological License Application. HGS is also conducting key characterization studies in non-human primates and will be conducting additional confirmatory efficacy studies in these animals; HGS has previously shown that administration of ABthrax immediately after exposure to anthrax significantly increases survival in non-human primates. HGS will be conducting additional studies in a therapeutic setting. HGS has already conducted a Phase 1 clinical trial in humans to evaluate the safety, tolerability and pharmacology of ABthrax in healthy adults and has initiated the additional human studies that will be required for EUA and BLA approval.

Our preclinical data also show that ABthrax administered prophylactically (before exposure to anthrax) or immediately afterwards increases survival rates significantly and thus

ABthrax could be used to protect rescuers entering a contaminated building or soldiers in an infected environment.

Procurement of ABthrax under Project Bioshield

Many companies have the capability and are willing to develop new products to protect against attack by biological and chemical weapons or other dangerous pathogens. However, very few companies, such as HGS, have already done so. In fact, HGS is among the largest, best funded, and most qualified companies to participate in Project Bioshield to date.

The fact that HGS was successful in negotiating a viable business relationship with the federal government to purchase ABthrax should have sent an extremely powerful, positive signal to similarly qualified companies considering whether to enter this market. The primary challenge of bio-pharma companies such as HGS is the absence of a commercial market for such drugs. In most cases, the only viable market is the federal government and, potentially, our foreign allies. Project Bioshield, which aims to harness public and private resources in an innovative effort to develop defenses against bioterrorism, is specifically intended to create such a market. With the consummation of the contract for ABthrax, the promise of Project BioShield's ability to create a market for anthrax therapeutics was realized.

As the first Bioshield procurement for a product developed after 9/11, the ABthrax contract allows for the acquisition and maintenance within the SNS of therapeutic products to treat US civilians who have inhalational anthrax disease. The remaining development and manufacturing will be completed at HGS' Rockville, Maryland facilities by 2008, pending FDA approval. HHS has currently agreed to purchase 20,000 doses of ABthrax for the SNS. While

HHS has not yet committed to exercise all of the options for production quantities for ABthrax contained in the contract, the contract does include options, and pricing, for a broad range of quantities ranging from 10,000 doses to 100,000 doses. As is the nature of biologics production, the cost per dose of 100,000 doses is significantly less than the cost per dose of 10,000 doses. Given the limited quantities of anthrax vaccine currently in the SNS, it may be prudent for HHS to consider purchasing additional quantities of ABthrax to be available in the event of another anthrax attack. The sooner HHS makes the decision, given the lead time required for manufacturing, the sooner we will be able to deliver additional quantities beyond our initial commitment.

Proposed Implementation Improvements

While HGS very much appreciates its positive experience with Project BioShield and its work with HHS in performing under the ABthrax contract, Congress and HHS can take several steps to increase industry participation in Project Bioshield.

To begin, the recently enacted Biopharmaceutical Advanced Research and Development Authority (BARDA) legislation is a significant step by Congress to provide HHS with additional tools to ensure success of BioShield. We applaud the bi-partisan leadership of Senator Richard Burr (R-NC) and Senator Edward Kennedy (D-MA), as well as Representative Mike Rogers (R-MI) and Representative Anna Eshoo (D-CA) in making BARDA a reality. It is now incumbent upon Congress to fund fully BARDA to realize the benefits of these powerful tools. HGS strongly supports the industry's recent recommendations to fund BARDA with at least $500 million in appropriations in Fiscal Year 2008. We also urge HHS to hire an individual with private sector drug development experience to lead BARDA, as was the clear intent of Congress.

In addition to fully implementing - and funding - BARDA as soon as possible, HHS should enact regulations required under the Act that take into account the regulatory flexibility included in both Project BioShield and BARDA in order to realize fully the legislative intent of Project Bioshield. First and foremost, HHS should make clear that the statute does not require contractors to comply with burdensome government procurement requirements, including the requirement for certified cost and pricing data, in order to stimulate the maximum interest possible by commercial companies. Similarly, HHS should avoid the use of cost-type contracts or contract line items (thus, eliminating the need for a proposed contractor to adopt non-GAAP accounting practices) wherever possible.

HHS should also consider structuring Bioshield contracts to avoid a "staged" procurement approach such as what occurred with the Anthrax therapeutic contract, wherever possible. While we recognize the need for staged procurements under certain circumstances, using this method where HHS has conducted proper market research will avoid unnecessary delays and unpredictable results, thereby stimulating far greater private sector interest. Of course, the advance development authority - and eventual funding - available under BARDA should provide the necessary tools to HHS to avoid this result in the future.

Finally, while HGS has found the Food and Drug Administration to be extremely responsive in working with us on the preclinical and clinical studies that will be needed for EUA and BLA approval of ABthrax, there remains a need for greater clarity about the regulatory requirements for an EUA and the decision making process necessary for final approval to stockpile an as yet unlicensed biological product.

All agencies responsible for administering Project Bioshield should take a proactive approach to identifying, evaluating and procuring effective countermeasures. I applaud the Subcommittee for its continued oversight of this critical bio-defense program. In the case of ABthrax, HGS is working in true partnership with HHS, as intended by Project BioShield, to bring ABthrax into production, and eventually, into the Strategic National Stockpile. We look forward to delivering on our commitment to HHS, and the American people, in 2008 and appreciate every effort to ensure that additional quantities of ABthrax are purchased for the stockpile, as appropriate.

Thank you again for this opportunity to testify and I look forward to answering your questions.