Reconstructing the Future

PHOTOS COURTESY OF THE NATIONAL ANIMAL DISEASE CENTER

The USDA is spending nearly a half billion dollars to build a new, state-of-the-art animal disease research facility in Ames, Iowa.

by ***Stephanie Veldman***

The national animal disease facilities in Ames, Iowa, are now inadequate to meet modern animal health research and diagnostic needs, according to James Roth, a professor in veterinary microbiology and preventive medicine at Iowa State University (ISU) in Ames. He says building a new facility is necessary to meet requirements for biosafety, biosecurity and research to keep our animals and food supply safe. The U.S. Department of Agriculture (USDA) has an excellent staff of scientists, but they are limited in what they can accomplish by the outdated facilities they have to work in, Roth says.

The facilities in Ames were built in the 1950s through the early 1970s. They are antiquated, inefficient and difficult to maintain, Roth says. The proposed facility, which is scheduled to be completed over the next six to 10 years, will give the United States a state-of-the-art research and diagnostic facility.

With U.S. livestock production annually valued at nearly $100 billion, with exports at nearly $10 billion, Roth says that it is time that the United States invested in an upgrade of its research facilities.

Roth says the estimated cost for the new facility is roughly $430 million. About $112 million has been received, but more than $300 million still needs to be appropriated. All of the money is coming from the U.S. government, with most of the money coming through the agricultural appropriations process. Some of the funds were also received from supplemental bioterrorism appropriations after the terrorist attacks Sept. 11, 2001.

"Funding is urgently needed, so we are hopeful that Congress will, this year and next year, complete the funding," Roth says.

Eric Juzenas, counsel for the Senate Agriculture Committee, says Congress doesn't have a budget for distribution of the funds. And given the uncertainty of Congress's yearly budget, the amounts appropriated will vary from year to year. The project does have supporters in Congress who will be pushing for funding.

"Senator [Tom] Harkin (D-Iowa) will be pushing for a fairly aggressive payment schedule, so we can keep the reconstruction going, but he will have to convince the rest of Congress to go along with him," Juzenas says. "Over the next year, we are certainly heading into a tighter budget situation."

The new building, which will be built close to the existing facilities, will combine two agencies — the Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS) —

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►The USDA is building a new facility in Ames, Iowa, to meet national needs for animal health research, diagnosis and product evaluation. "The vision is that we will be the hub of animal disease research activities in the U.S.," says Keith Murray, director of the NADC. "We have a strong international presence at the moment, but I think that will become even stronger."

Animal diseases then and now

Through the past 40 years, the National Animal Disease Center (NADC) in Ames, Iowa, has seen many changes, both in technological advancements and changing research in animal diseases.

The NADL (National Animal Disease Laboratory) opened in Ames in 1961. It was built on 318 acres donated by the state of Iowa. Diseases like brucellosis, viral diarrhea, leptospirosis, fowl cholera, salmonella and foot rot have been studied.

In 1973, the facility was renamed the NADC. The focus of the center was, and has continued to be, conducting basic and applied research on the diseases of livestock. The diseases researched have evolved from those researched 40 years ago, though.

►"We are trying to understand the diseases in wildlife so we can protect domestic livestock," says Keith Murray, director of the NADC. Three wildlife diseases the NADC is studying are brucellosis, tuberculosis and chronic wasting diseases.

Keith Murray, director of the NADC, says that on the side of technological advancements the changes at the center have been enormous. "The whole biological science arena is totally different from what it was 50 years ago. In fact, they had just started to explore the structure of DNA."

Murray says that when he first joined the NADC they were just beginning to work with wildlife diseases.

"Fifty years ago wildlife disease research was not in the equation at all. Now we have programs with bison, with elk and with white-tailed deer," he says. "We are trying to understand the diseases in wildlife so we can protect domestic livestock."

Murray says that three wildlife diseases they are studying are brucellosis (Bang's disease), tuberculosis (TB) and chronic wasting diseases (CWD).

Another major focus has been on food safety, preventing *E. coli* O157:H7 and salmonella contamination. Scientists at the NADC and Iowa State University (ISU) in Ames developed a new way of detecting small levels of fecal contamination that cannot be detected visually on carcasses. This new technology is being used by packers to help the industry meet new food safety regulations designed to control deadly bacteria.

Murray says, "It is not about preventing livestock disease, it is about preventing human disease."

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under one roof. It will house the ARS National Animal Disease Center (NADC), the APHIS National Veterinary Services Laboratories (NVSL) and the APHIS Center for Veterinary Biologics (CVB) together, instead of their operating out of separate facilities as they currently do.

"I think we have a vision for the NADC and for the other two centers. The vision is that we will be the hub of animal disease research activities in the U.S.," says Keith Murray, director of the NADC. "We have a strong international presence at the moment, but I think that will become even stronger. We are very excited about bringing these three groups together."

Why is a new facility needed?

The plan for the reconstruction was started when Congress passed the Federal Agriculture Improvement and Reform Act of 1996. The act directed the Secretary of Agriculture to review current and planned agriculture research facilities. The task force she employed to research these facilities came back with a report outlining a 10-year strategic plan expressing a new vision for agricultural research.

The task force found that the animal health facilities in Ames were outdated and difficult to maintain. They also concluded that a new facility is necessary because of new animal care standards and 50 years worth of technological advances that require more space to do the same amount of work.

"We don't really plan on doing more work here; we will do roughly the same amount. But, with the change in standards of facilities, we have to have more square footage," Murray says.

ARS operates four biocontainment facilities — the NADC; Plum Island Animal Disease Center (PIADC), Orient Point, N.Y.; Southeast Poultry Research Laboratory (SEPRL), Athens, Ga.; and Arthropod-Borne Animal Disease Research Laboratory (ABADRL), Laramie, Wyo. According to Juzenas, priority was given to renovating the facilities in Ames, but all four facilities will go through an upgrade.

"The task force report determined the facilities of the NADC needed to be rebuilt, and we needed a plan to do that," Murray says. "Sometime after that, our customers and stakeholders became seriously concerned about the state of our facilities, so they became active in obtaining funding for it."

Murray adds that the NVSL also

determined they needed new facilities, and created their own modernization plan with the CVB. Failing to get funding for it, in 1998 ARS and APHIS formed a joint plan, called the Ames Modernization Plan, to bring the three agencies together.

"Naturally, since there are two different agencies and three national centers involved, this is big," Murray says.

The building process

Construction of the new facility is slated to begin in September 2003. Murray says the project is split into five parts, and sections will be built in order of priority. The first section to be constructed is the high-containment animal barn, which will be a Biosafety Level-3 Agriculture (BL-3Ag) laboratory. BL-3Ag laboratories house microbiological agents that are extremely infectious to livestock or plants. For example, foot-and-mouth disease (FMD) is considered a BL-3Ag disease. FMD is considered a foreign animal disease, though, so it would not be sent to NADC labs, because they only work with domestic animal diseases. Currently FMD is not in the United States.

The second area to be constructed will be the main laboratory building. The third area is a lower-risk biocontainment animal facility for animals at a BL-2 security level or below, such as animals infected with highly virulent strains or certain genetically engineered strains of current domestic diseases such as bovine viral diarrhea (BVD), *E. coli* or *Salmonella*. Fourth on the list is to install the administrative building and conference center. Lastly, Murray says, the administrative offices will be built.

"To build any one of these things, three sequential things need to be done. The first is the programming. That is where the architects speak to all the staff and basically make judgments as to what is necessary," Murray says. "The second step is the planning and design. This is very detailed. What does every lab look like? Where do the benches go? The third step, then, is the construction.

"Each of these five major chunks is going to have these three things done to them by different architectural engineering companies," Murray adds.

The four main architectural engineering companies that have been hired are Hellmuth, Obata & Kassabaum Inc. (HOK),

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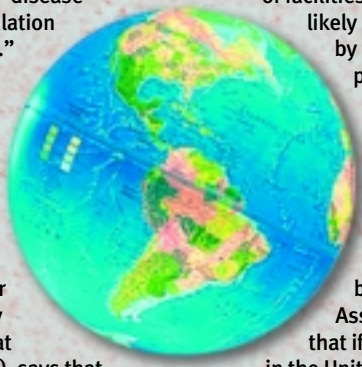
International regulations

Another new factor in disease research is the increasing export market. Fifty years ago, exports weren't as serious a consideration to farmers as they have become, says Keith Murray, director of the National Animal Disease Center (NADC), Ames, Iowa. "We have to make our animals healthy, not just to grow faster or better, but we have to keep them healthy so we can export them. The whole international scene of disease control — disease surveillance, disease regulation — is absolutely incredible."



Countries such as Australia, Canada and Germany have, or will soon have, major new national animal disease facilities to meet their countries' animal health demands.

James Roth, a professor in veterinary microbiology and preventive medicine at Iowa State University (ISU), says that he visited the new animal disease research facilities in Winnipeg, Manitoba, Canada, in December 2002. "Their population base and their ag economy is much smaller than ours in the United States, yet they have more sophisticated, more modern facilities than we have. They can do experiments that we can't do in the U.S. It is time for the United States to invest to upgrade our facilities to what other countries already have. We should be beyond what other countries already have."

Roth adds that in a few years, the World Organization for Animal Health [Office International des Epizooties (OIE)] will have new standards for trading animals. "Every country currently has to demonstrate it is free of certain diseases in order to be able to sell its animal products to other countries."

Within a few years the National Veterinary Services Laboratories (NVSL), the diagnostic laboratory for the United States, will have to meet ISO/IEC International Standard 17025 requirements.

"These standards require a certain level of facilities, and our facilities will likely not meet those standards by the time they are passed," Roth says. "We will be in a situation where we won't have the facilities to certify that we are free of hog cholera and foot-and-mouth disease."

A newsletter released by the U.S. Animal Health Association (USAHA) said that if government laboratories in the United States wish to continue to operate they must meet the ISO/IEC 17025 standards. "Managers of the NVSL and Center for Veterinary Biologics (CVB) are concerned that the present laboratories in Ames, Iowa, may not meet the requirements of ISO/IEC 17025, and these laboratories may not pass the assessment required for accreditation," according to the USAHA newsletter, which can be found on the NADC Web site at *www.nadc.ars.usda.gov*.

"We really have no choice in the reconstruction if we want to keep open trade and be able to sell our products to other countries," Roth says. "We have to have laboratories that meet modern, international standards."

►Construction of the new facility is slated to begin in September 2003. The first priority is to build a high-containment animal barn, which will be a BL-3Ag laboratory.

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Saint Louis, Mo.; Merrick & Co., Aurora, Colo.; Flad and Associates, Madison, Wis.; and STV Architects, Douglassville, Pa. They will work with several partner firms to plan and design the new facility.

Three-in-one

The logic behind bringing the three centers together is compelling. Each is responsible for a step in the process, from researching disease to developing vaccines.

The NADC is the research arm for animal and poultry diseases that occur in the United States. Teresa Sutton, public relations officer for the NADC, says that it works to develop new or better diagnostics, new vaccines and other ways to control diseases.

The NVSL is responsible for disease surveillance — either tracking where disease is occurring or surveying to see that the country is free of disease. It is a critical component of defense against domestic and foreign animal diseases in our animal populations.

"The NVSL performs animal disease testing for Veterinary Services and is the only laboratory system in APHIS dedicated to the testing of diagnostic specimens for domestic and foreign animal diseases," according to a newsletter printed by the U.S. Animal Health Association (USAHA) that is posted on the NADC Web site at *www.nadc.ars.usda.gov*.

"They are the diagnosticians; we are the researchers," Sutton says. "The scientists at the CVB make sure the biologics — the vaccines — are pure, safe, potent and effective."

"We are very excited about the prospects of bringing these groups together. The diagnostic group, for example, has needs. They know what is going on. They know what the diseases are. They know what their needs are," Murray says. "They need to translate these needs to us, the researchers, so we can be moving in the right direction to come up with the discoveries that are going to help them.

"Similarly, the biologics groups have needs, and they understand their market and their customers, but they need input from the diagnosticians to help with that as well," he adds. "We work well together already, but bringing us together in a single, large facility is really going to help internal, interagency communication, setting priorities and focusing on what is the most cost-effective, efficient way to do our business." AJ

► Bringing the NADC, NVSL and CVB together will help three agencies work more efficiently to protect U.S. livestock from diseases, including wildlife diseases, according to Murray.