

Animal Genome Reagents and Tools Remain Fundamentally Important

Submitted by National Animal Genome Research Program (NAGRP) Coordinators at the request of, and on behalf of, the NAGRP/NRSP-8 Committee membership:

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This letter is to indicate our concern regarding the announced plan to sunset National Research Initiative Program 43.1, Animal Genome Reagent and Tool Development, in FY 2006. In a recent review, Venter et al. (*Nature Genetics* 33:219-227) stated that “**genomics was, and still is, driven by innovative technologies, perhaps more so than any other scientific area in recent memory.**” Program 43.1 has played a critical role in the spectacular advances in agricultural animal genomics that have occurred since its inception, culminating in the draft level genome sequences of the chicken and cow and the anticipated sequence of the pig genome. This Program has been unique in several ways:

1. It supports “discovery” research and technology developments that generate new approaches, rather than hypothesis-driven research as is supported by most other NRI Programs. This type of research is often at a competitive disadvantage in that it’s not designed to answer a specific scientific question, and its impact is more diffuse and long term and perhaps harder to estimate.
2. It emphasizes collaborative/consortium approaches that address the needs of whole communities of researchers. As a result, reagents and tools resulting from these projects are publicly available, so that all can benefit. This availability is particularly important to individual scientists (including new investigators and scientists at smaller institutions) who would not otherwise be able to procure these resources on their own. In addition, these resources are particularly cost-effective and have created a wave of genomics-based research that continues to spread throughout and inform all of the animal sciences.
3. The larger funding limit of these grants allows for the implementation of genomics technology that is not feasible at the usual NRI Program grant levels. In the long run, these awards leveraged interest, for example, from National Institutes of Health-supported genome sequencing centers, that was critical in the cattle and chicken genome sequencing efforts.

Although draft level genome sequences significantly alter the ways in which animal genetics is done, we believe that **there are at least as many critical post-genome sequence tools and reagents, as existed prior to that sequence.** Priority post-sequence tools include high density polymorphism (SNP) development and genotyping technologies, proteomics reagents (high throughput expression and two-hybrid libraries and monoclonal antibody libraries, mass spectrometry tools and data), high throughput mutagenesis strategies (RNAi, artificial chromosomes), comparative genomic hybridization arrays, and local or widespread finished sequence quality acquisition.

At the same time, the NAGRP supports research on many agricultural species that lack genome sequences, some of which are likely to do so for some time to come (e.g., pigs, sheep, goats, horses, poultry other than chicken, and a wide range of aquaculture species). Genomics resource needs vary among these

species, but generally include comparative maps to take advantage of genome sequences of related species, EST development, BAC libraries and contig maps, and high density linkage maps.

There are also tools and reagents that are important in both pre- and post-sequence genomics. Among these, there are particular needs for bioinformatic tools, microarrays and expression profiling tools, transgenic animal technology, and development of cytogenetic assays. It's not the intent of this request to carefully outline what tools and reagents are most appropriate for each species. This is a moving target, as surely new genomics-related tools will continue to emerge. The NRI review panel is in the best position to provide advice on the relative merits of various technology proposals, as long as a Program exists that's ready to receive them.

Thus, we urge that the proposed sunset of NRI Program 43.1 be reconsidered. Perhaps specific language should be drafted to emphasize that both pre- and post-sequence tools and reagents are considered and to communicate the variety of tools that are now needed. If asked, we would be happy to assist in this effort in any way we can. Alternatively, CSREES may prefer to define a new program that would still include animal genome tools and reagent development and retain the unique advantages listed above for 43.1, but that would be re-named to emphasize the fundamental role of technology development and "discovery" research in modern animal systems biology.

Thank you for the opportunity to comment, both in person at the recent Plant and Animal Genome XIII Conference and here in writing.