Pig Genome Web Site: Online Resources For Swine Molecular Genetics and Genome Information

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Summary and Implications

The pig genome Web page provides materials for swine researchers, students, producers, and members of the industry with information covering all aspects of swine genetics, genomics, and animal breeding. This Web site is the home of a great deal of diverse and interesting information, including the pig genome database (PigBase) and the pig expressed sequence tag (EST) database, and it houses an animal gene mapping discussion forum (ANGENMAP mail list). This site also includes a bimonthly swine genome newsletter and information on gene mapping materials and information. This resource plays an important role in swine genetics and swine breeding education by including tutorial materials and lecture notes on genetics, gene mapping, QTL detection, and genetic linkage analysis. Many additional pig genome Web sites worldwide also can be accessed from this site.

Introduction

In the race to explore the genetics and genomes of humans and other species, the swine genome is one of the genomes of domestic animals receiving a great deal of attention, according to the statistics on DNA sequence collection. Consequently, a considerable amount of information has been generated. Efficient assembling, optimal integration, and understanding swine genetics and genome information are all crucial for swine geneticists and breeders. The main components of the pig genome server are the pig genome web site (www.genome.iastate.edu), the pig EST Web site (pigest.genome.iastate.edu), the pig genome database (PigBase), and the pig EST database. In addition, there is a great deal of educational material. This server also supports a discussion forum for the animal gene mapping community (angenmap@db.geneome.iastate.edu). This server is funded by the US Pig Gene Mapping Coordination Program, which is funded by USDA/CSREES.

Structure and Function of Pig Genome Server

The Pig Genome Web Site. The resources provided via the pig genome Web site can be classified into four sections: 1) communication among members, 2) information on primers and mapping materials provided by the coordination program, 3) databases and gene maps, and 4) educational materials and collective information or links on pig industry and genome research. Recent statistics showed that every month (from January to August) this Web site received approximately 995,000 hits from 34,000 Internet users and they examined approximately 17,000 files. Among the four sections, educational materials (for example, QTL lecture notes by M. Rothschild, by J. van der Werf, Maker Assisted Selection, MAS by J. Dekkers) were most frequently accessed, followed by the section of the pig genome database and gene maps etc.

The Web site is designed to serve the general public as well as scientists. High school students may benefit from our introductory materials on genetics. For example, Gene Blue, the principles of genetic inheritance (www.genome.iastate.edu/edu/genetics/index.html) is developed to educate high school students and others on the principles of genetic inheritance. Another section includes An Introduction to Genes and Gene Mapping (www.genome.iastate.edu/edu/gene/index.html) and covers primary information on genes, gene mapping history, and principles and a genetics glossary. A Primer on Molecular Genetics (www.genome.iastate.edu/edu/doe/index.html) is an excellent introduction to molecular genetics for college students. Most researchers are interested in the genome database query to retrieve references for their investigations. The QTL and MAS sections (www.genome.iastate.edu/edu/QTL/) may be useful for quantitative geneticists. Finally, The Pig Industry Handbook page (www.genome.iastate.edu/edu/PIH/index.html) is

dedicated to swine producers. Its coverage ranges from the production system, nutrition, management, health care, genetic resources, and pork process to marketing.

Gene Mapping Databases. The pig genome database (PigBase) was created by the Roslin Institute (UK) and edited by Roslin Institute and Iowa State University. The PigBase accommodates published information on swine gene mapping or swine genetics-orientated information. It is comprised of swine genes and gene maps, abstracts, and experiments.

The Pig EST Web Site. This Web site was set up in early 2000. The main function of this site is to support expressed sequence tag (EST) data analysis and to facilitate the selection of ESTs for physical mapping. Since the introduction of the web query to the EST database (pigest.genome.iastate.edu/query.html) in July 2001, the number of hits to this specialized site has increased considerably. For instance, use has increased from 415 hits in May to 1,461 hits in August with interest coming from users in the United States, Britain, France, German, Japan, and other countries. Development of the Web site is in progress to introduce more Web-based tools (alignment analysis of user's sequence against the pig EST sequences and visualization of the sequence analysis results). The pig EST database contains identities and sequences of approximately 14,000 pig ESTs, analysis results of the EST alignment against human Unigene sequences (www.ncbi.nlm.nih.gov/UniGene), related radiation hybridization map information (www.ncbi.nlm.nih.gov/genemap99), and human-pig comparative maps.

The Animal Gene Mapping Discussion Group. This online forum provides an important site for communication. To date, there are 854 members and more than 2,000 messages have been posted for discussion. These discussions focus on problems related to gene mapping experiments, reference query/exchanges and genetics-orientated position announcements.

Conclusions

This Web site provides useful information for swine geneticists, swine producers, industry personnel, and the public. Access to it can be reached by going to www.genome.iastate.edu. Individuals are encouraged to browse the Web site.