NATIONAL INSTITUTE OF ARTHRITIS AND MUSCULOSKELETAL AND SKIN DISEASES

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Mission:
The National Institute of Arthritis and Muskuloskeletal and Skin Diseases (NIAMS) supports basic, clinical, and epidemiological research, research training, and information programs on many of the more debilitating diseases affecting the American people. The burden associated with these diseases is significant — most are chronic and many cause life-long pain, disability and disfigurement. These diseases include the many different forms of arthritis and other rheumatic diseases and numerous disorders of the muskuloskeletal system and the skin that affect people of all ages, racial and ethnic populations, and economic strata. Many of the diseases within NIAMS' mandate have a disparate impact on women and minorities, who often suffer worse outcomes. NIAMS is committed to uncovering the bases of these gender, racial, and ethnic disparities and the devising effective strategies to treat or prevent them.

Selected Achievement and Initiatives:
OA Biomarkers Network: A New Way to Study Disintegrating Joints: To hasten the pace of discovery of molecular biomarkers for osteoarthritis (OA), the NIAMS has established the Osteoarthritis Biomarkers Network. Five institutions in the United States and Sweden received grants totaling $4.6 million over 5 years. For the first time, researchers who have been individually studying OA biomarkers — molecular indicators of disease presence and progression — will share clinical, biological and human resources. Through the Network, investigators will learn more about joint destruction by identifying and monitoring biomarkers in joint, bone and synovial tissues. This could provide the clues needed to define the stages of disease on a more consistent and reliable basis.

Autoantibodies Precede Disease in Lupus Patients: A new study funded largely by the NIAMS reveals that people diagnosed with systemic lupus erythematosus (lupus) have autoantibodies — proteins that attach to the body's healthy tissues by mistake — in their blood years before the symptoms of lupus appear. Researchers tested blood from 130 U.S. armed forces servicemen and women, without knowing their identities, who were once healthy but later developed lupus. Using many years of previously collected samples from the Department of Defense Serum Repository, the researchers compared samples from the lupus patients to samples from those who never developed lupus. When testing early samples from both groups, they found that those with lupus had the autoantibodies in their blood for months to years before symptoms appeared. Some of the autoantibodies, such as antinuclear antibody, had been present longer than others. The lupus autoantibodies tend to accumulate in the blood in a predictable pattern up until diagnosis, when the rate of new autoantibodies slows. The early detection of autoantibodies may help in recognizing those who will develop the disease and allow physicians to monitor them before they might otherwise be noticed.

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Scientists Find Gene Variant That Increases Susceptibility to Juvenile Rheumatoid Arthritis: A genetic variation within the interleukin-6 (IL-6) gene increases susceptibility to systemic juvenile rheumatoid arthritis (JRA), according to researchers funded in part by the NIAMS. Researchers collected DNA samples from children with systemic JRA and one or both parents. The transfer of genetic information from parent to child was analyzed in 100 British families, 95 American families and 27 French families. The scientists found excess transmission of a genetic variation (-174G nucleotide variant) within the IL-6 gene from parent to child. Children who developed systemic JRA at age 5 or older showed significantly higher levels of this variant compared to the children who developed the disease before age 5. These findings suggest that there may be distinct genetic profiles for the disease that result in differences in age of onset and disease severity. Continuing to uncover disease-associated genes may lead to clinically useful subgroupings of systemic JRA.

Gene Therapy Reaches All Damaged Muscles in Muscular Dystrophy Mouse: Scientists supported by the NIAMS have discovered and demonstrated in mice a method of delivering genetic therapy for muscular dystrophy and perhaps other diseases of the muscle or heart. Scientists found that by giving a single injection of an adeno-associated viral (AAV) vector (a viral "vehicle" carrying a mini-dystrophin gene) into the bloodstream, they were able to deliver levels of dystrophin (a protein found in normal muscle tissue) that produced dramatic improvement of dystrophy in muscles throughout the body. These included muscles of the heart and lungs as well as skeletal muscle, such as those of the arms and legs. This research shows for the first time a method by which a corrected gene for dystrophin can be delivered, using a safe and simple method.

Genetic Site Suggests Psoriasis Susceptibility: A team of NIAMS-supported researchers have identified two genes on chromosome 17, SLC9A3R1 and NAT9, which are associated with psoriasis. The region between these two genes acts as a binding site for the protein RUNX1, which normally serves to regulate genes involved in immune reactions. The researchers found that when this region is altered, susceptibility to psoriasis occurs. This defective regulation may cause an increased activation of T cells, a type of white blood cell that normally helps protect the body against infection and disease. Such activation triggers inflammation and rapid turnover of skin cells in people with psoriasis. The findings from this research indicate further progress toward understanding the cause of psoriasis in patients with a family history of the disease.

Appropriations History
($ in thousands)

FY 2001	$396,460 (+13.3%)
FY 2002	$448,248 (+13.1%)
FY 2003	$486,143 (+8.5%)
FY 2004	$501,066 (+3.1%)
FY 2005	$511,157 (+2.0%)

Extramural Research Project Grants
(Includes SBIR/STTRs)

FY 2001	964
FY 2002	997
FY 2003	1,025
FY 2004	1,058
FY 2005	1,040

Success Rate — Research Project Grants

FY 2001	29%
FY 2002	23%
FY 2003	20%
FY 2004	20%
FY 2005	21%

Research Training Positions Supported

FY 2001	271
FY 2002	289
FY 2003	293
FY 2004	299
FY 2005	302

Research Centers

FY 2001	37
FY 2002	36
FY 2003	37
FY 2004	37
FY 2005	38