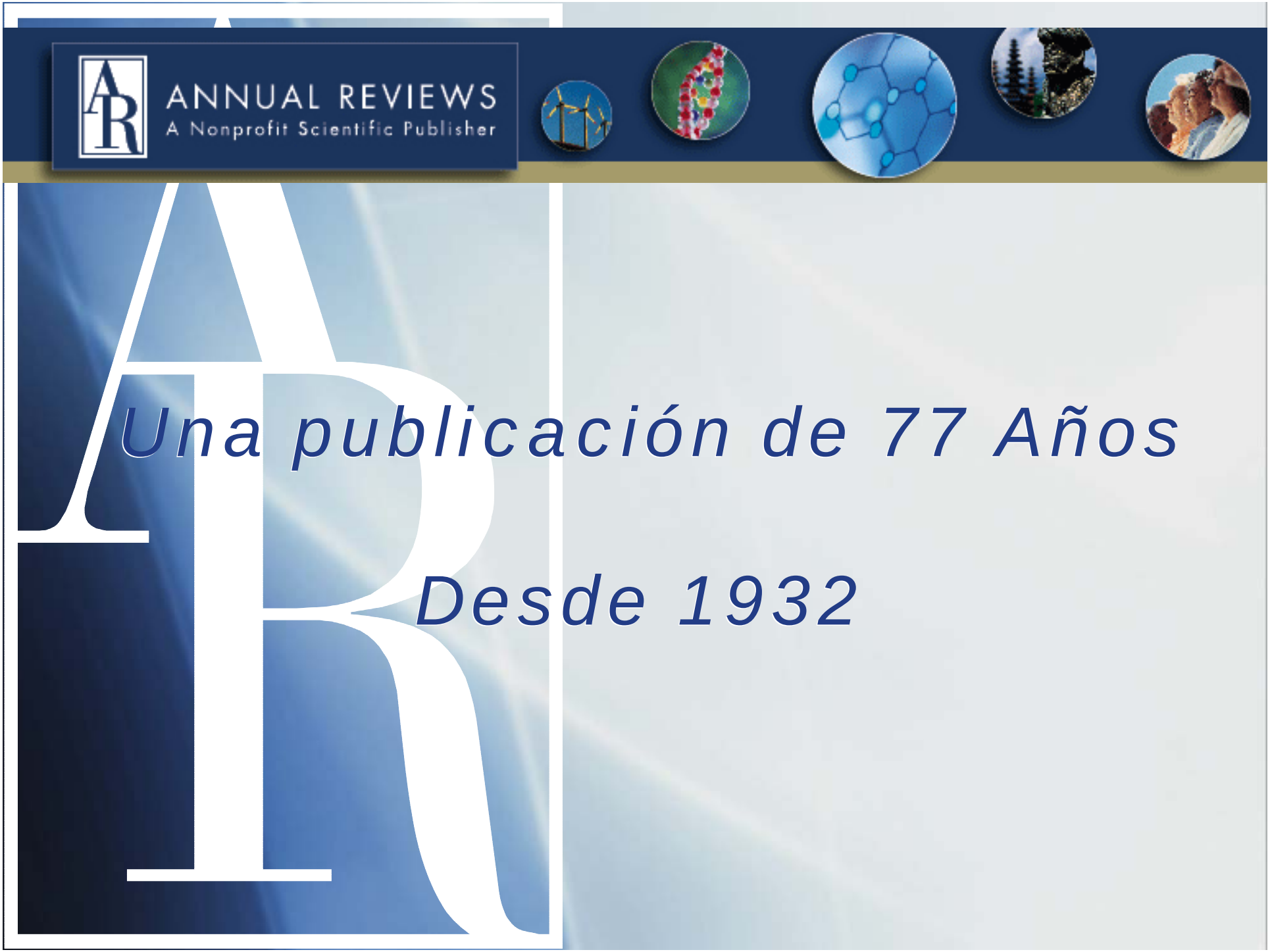
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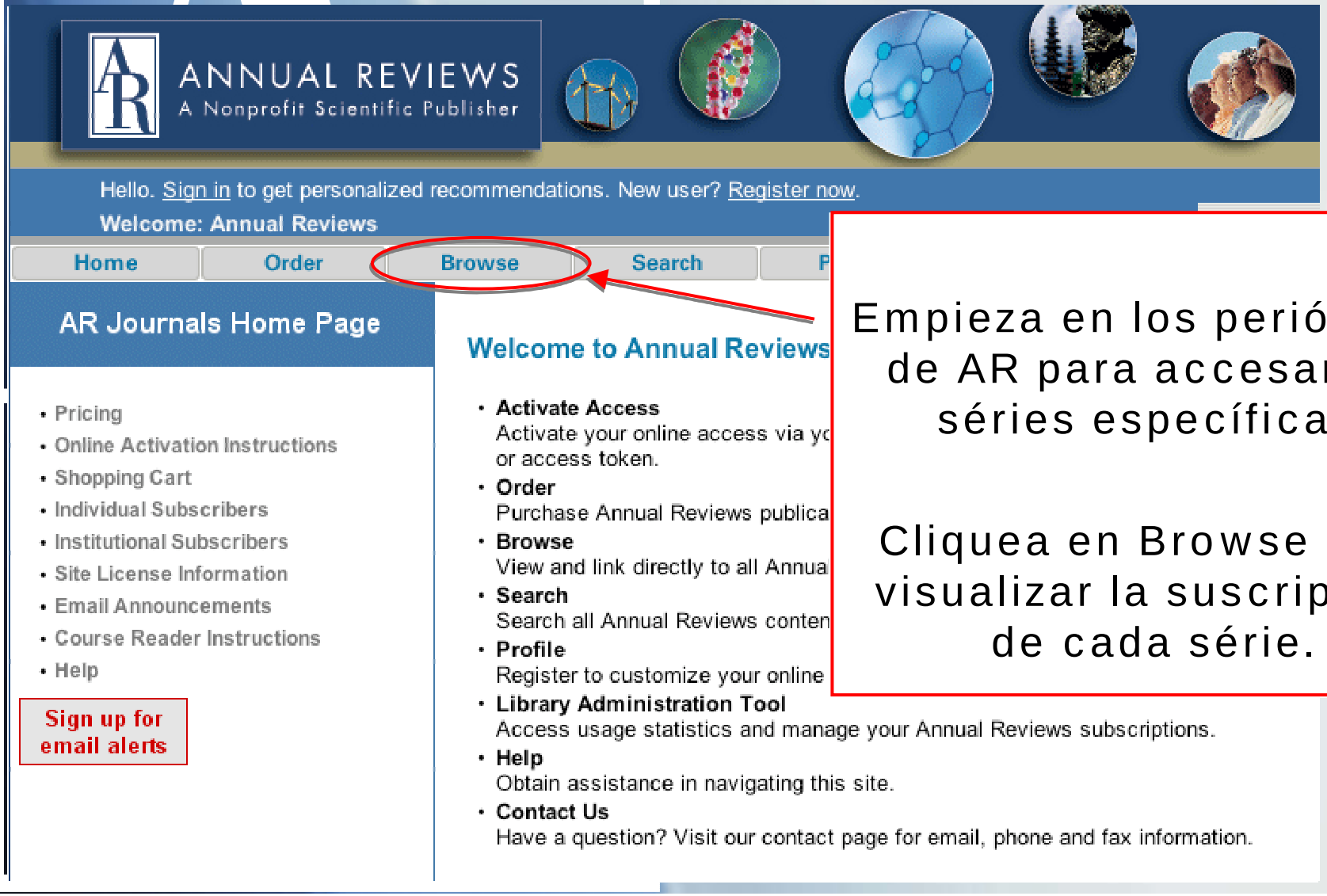

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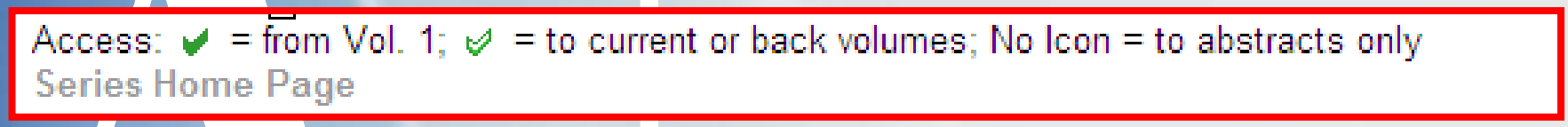

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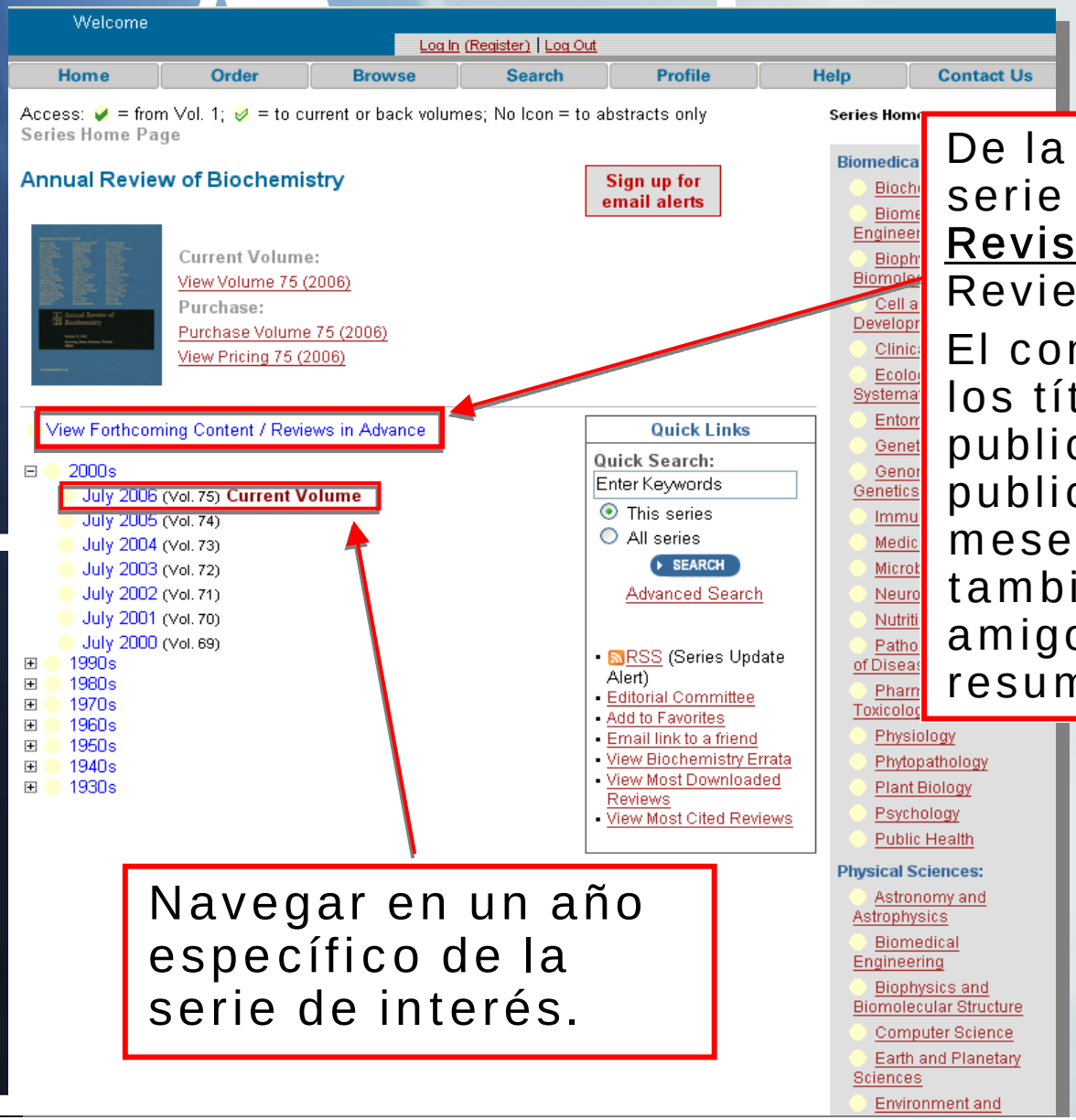

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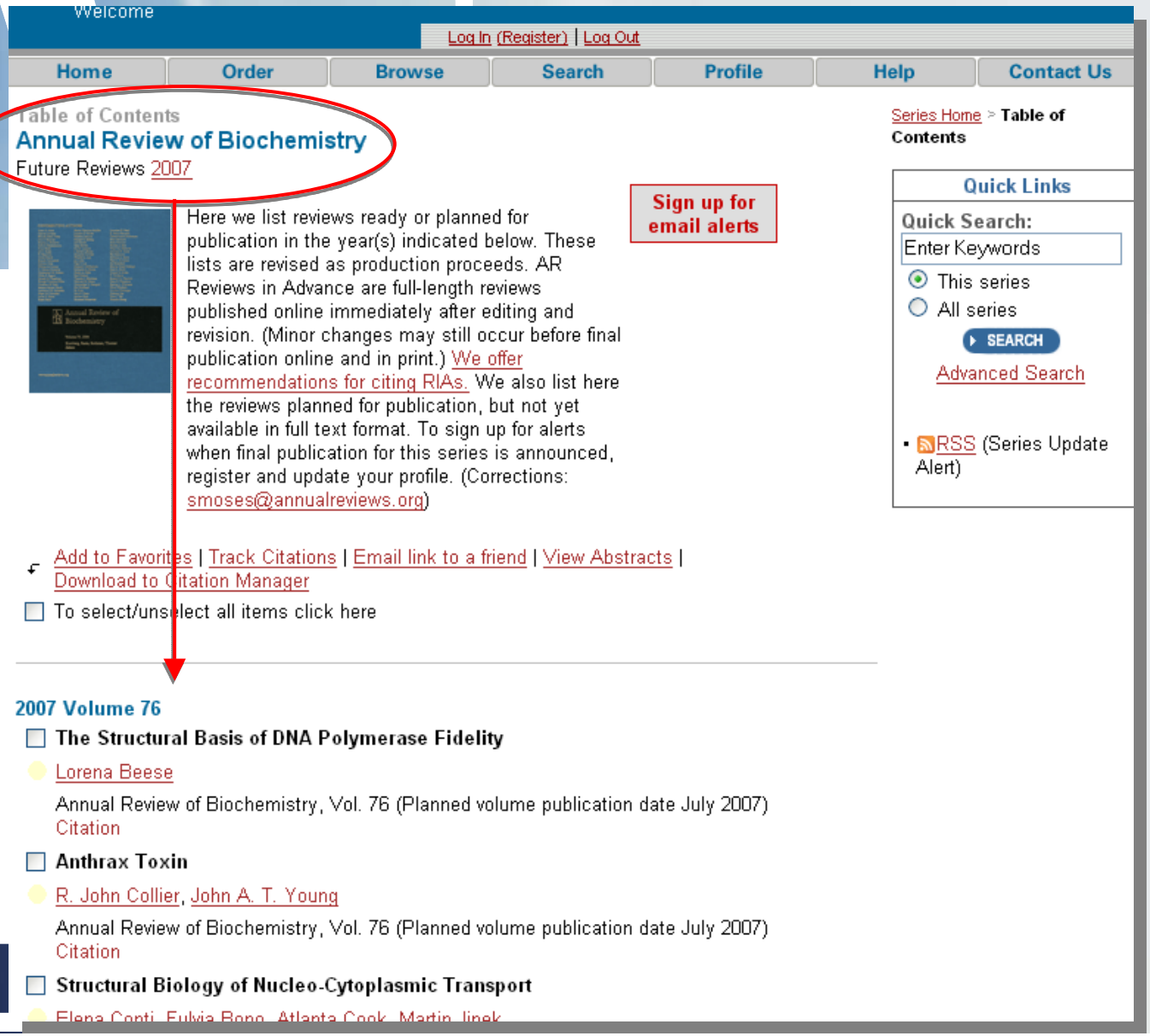

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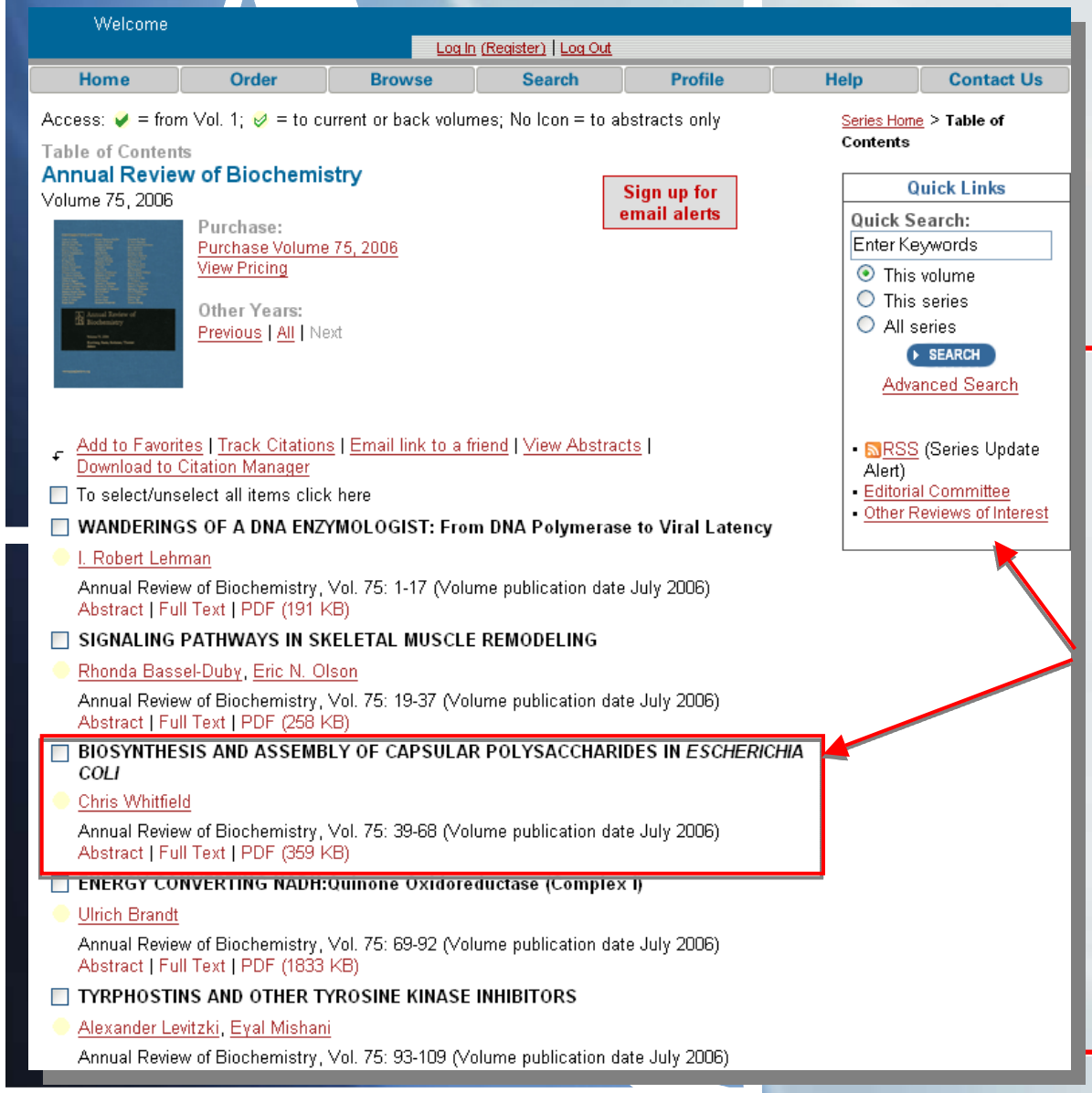

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ENERGY CONVERTING NADH:Quinone Oxidoreductase (Complex I)

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ABSTRACT

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NADH:quinone oxidoreductase (complex I) pumps protons across the inner membrane of mitochondria or the plasma membrane of many bacteria. Human complex I is involved in numerous pathological conditions and degenerative processes. With 14 central and up to 3 accessory subunits, complex I is among the largest membrane-bound protein assemblies. T peripheral arm of the L-shaped molecule contains flavine mononucleotide and eight or nine iron-sulfur clusters as redox prosthetic groups. Seven of the iron-sulfur clusters form a linea electron transfer chain between flavine and quinone. In most organisms, the seven most hydrophobic subunits forming the core of the membrane arm are encoded by the mitochon genome. Most central subunits have evolved from subunits of different hydrogenases and bacterial Na^+/H^+ antiporters. This evolutionary origin is reflected in three functional module complex I. The coupling mechanism of complex I most likely involves semiquinone interme that drive proton pumping through redox-linked conformational changes.

INTRODUCTION

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As one of the most fundamental metabolic principles, the vast majority of biochemical path involves "bound hydrogen" intermediates in the form of NADH, NADPH, or reduced flavoproteins. NADH generated in catabolic pathways is fed into energy converting electro transfer chains via NADH:quinone oxidoreductases. Three enzyme families catalyze this re This review focuses on proton translocating NADH:quinone oxidoreductase: This type of enzyme, usually called complex I, was first described in mitochondria (1), but it is also four many eubacteria where it is frequently termed NADH dehydrogenase-1 or NDH-1 (2, 3, Moreover, complex I is involved in bacterial photosynthetic electron transport (5, 6). In some

Contents

job, we were spared the worst of that dreadful period.

EARLY YEARS IN BALTIMORE

My early years were uneventful. I was a good, but not outstanding, student. During my last two years of high school, to help support the family, I worked part-time in a large meat market as a butcher's assistant. I became quite a skillful meat cutter and was promised a full-time job after high school graduation, a not inconsequential prospect because the United States was still mired in the Depression, and the possibility of college after high school graduation was very remote. All of this changed with the attack on Pearl Harbor by the Japanese on Sunday, December 7, 1941. I can still recall the radio announcer breaking in on the broadcast of the New York Philharmonic Symphony to report that Pearl Harbor had been attacked. The following day, the entire student body of my high school assembled to hear the radio broadcast of President Franklin D. Roosevelt's speech, "December 7, 1941 a date that will live in infamy." I remem-

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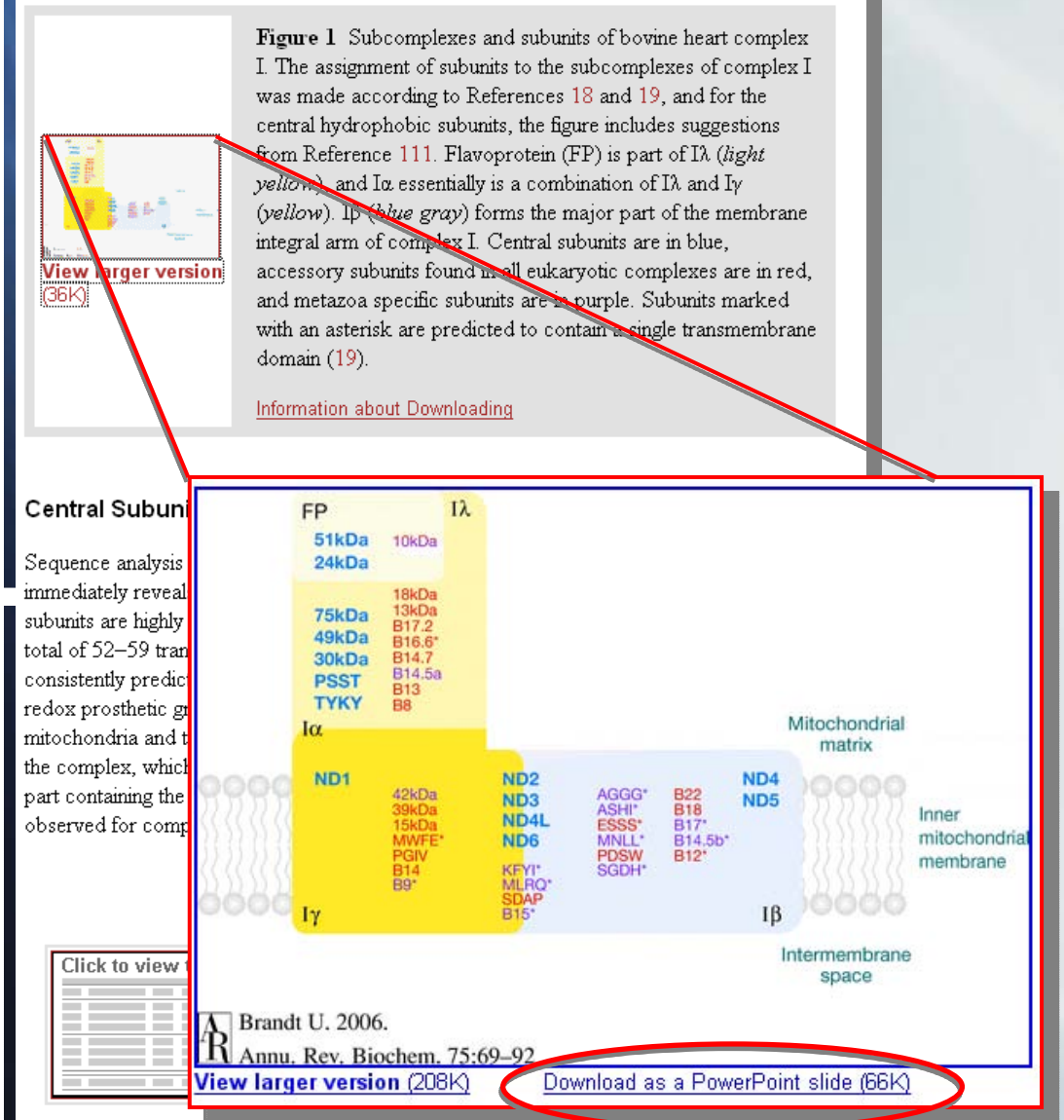

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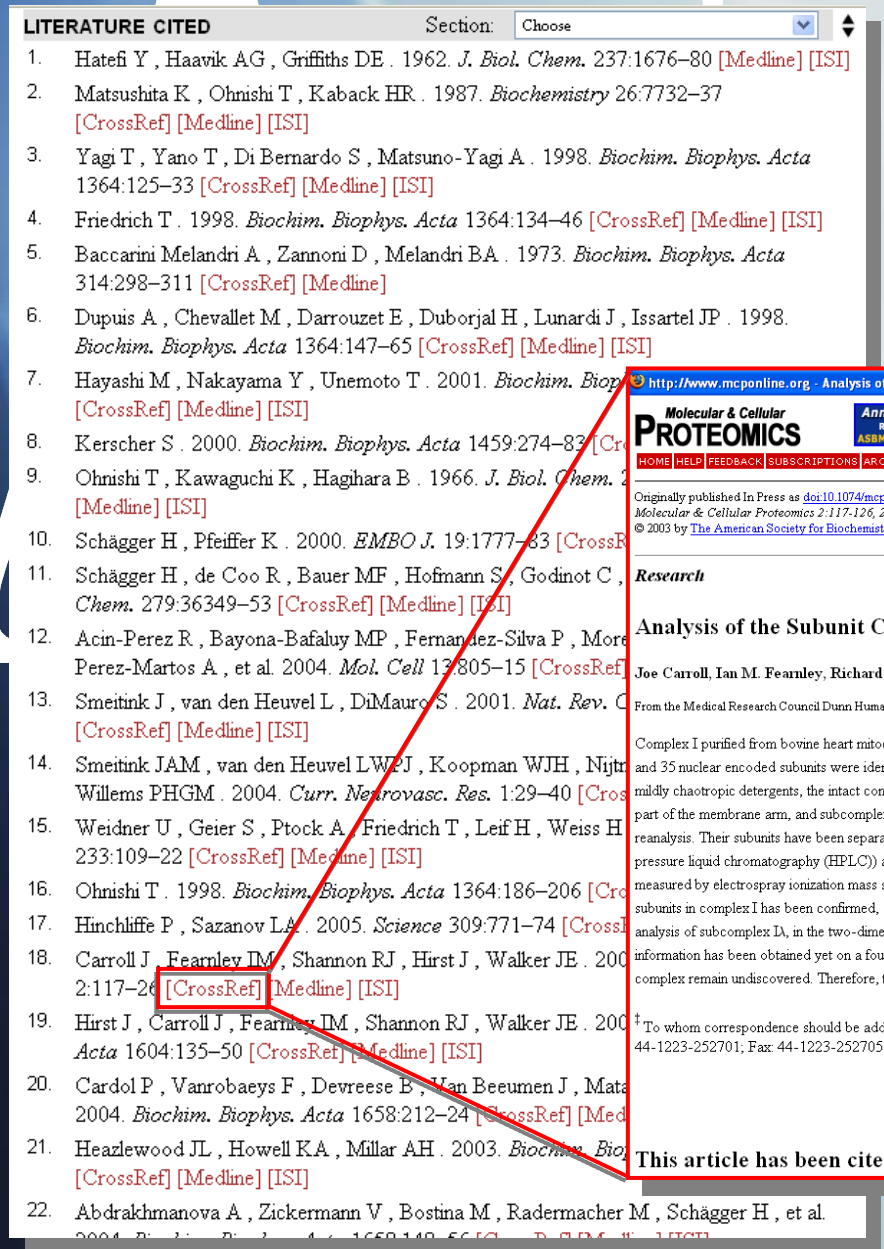

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Molecular & Cellular Proteomics 2:117-126, 2003.

Research

Analysis of the Subunit Composition of Complex I from Bovine Heart Mitochondria[*,S]

Joe Carroll, Ian M. Fearnley, Richard J. Shannon, Judy Hirst and John E. Walker[‡]

From the Medical Research Council Dunn Human Nutrition Unit, The Wellcome Trust/MRC Building, Hills Road, Cambridge CB2 2XY, United Kingdom

Complex I purified from bovine heart mitochondria is a multisubunit membrane-bound assembly. In the past, seven of its subunits were shown to be products of the mitochondrial genome, and 35 nuclear encoded subunits were identified. The complex is L-shaped with one arm in the plane of the membrane and the other lying orthogonal to it in the mitochondrial matrix. With mildly chaotropic detergents, the intact complex has been resolved into various subcomplexes. Subcomplex Iλ represents the extrinsic arm, subcomplex Iα consists of subcomplex Iλ plus part of the membrane arm, and subcomplex Iβ is another substantial part of the membrane arm. The intact complex and these three subcomplexes have been subjected to extensive reanalysis. Their subunits have been separated by three independent methods (one-dimensional SDS-PAGE, two-dimensional isoelectric focusing/SDS-PAGE, and reverse phase high pressure liquid chromatography (HPLC)) and analyzed by tryptic peptide mass fingerprinting and tandem mass spectrometry. The masses of many of the intact subunits have also been measured by electrospray ionization mass spectrometry and have provided valuable information about post-translational modifications. The presence of the known 35 nuclear encoded subunits in complex I has been confirmed, and four additional nuclear encoded subunits have been detected. Subunits B16.6, B14.7, and ESSS were discovered in the SDS-PAGE analysis of subcomplex Iλ, in the two-dimensional gel analysis of the intact complex, and in the HPLC analysis of subcomplex Iβ, respectively. Despite many attempts, no sequence information has been obtained yet on a fourth new subunit (mass 10,566 ± 2 Da) also detected in the HPLC analysis of subcomplex Iβ. It is unlikely that any more subunits of the bovine complex remain undiscovered. Therefore, the intact enzyme is a complex of 46 subunits, and, assuming there is one copy of each subunit in the complex, its mass is 980 kDa.

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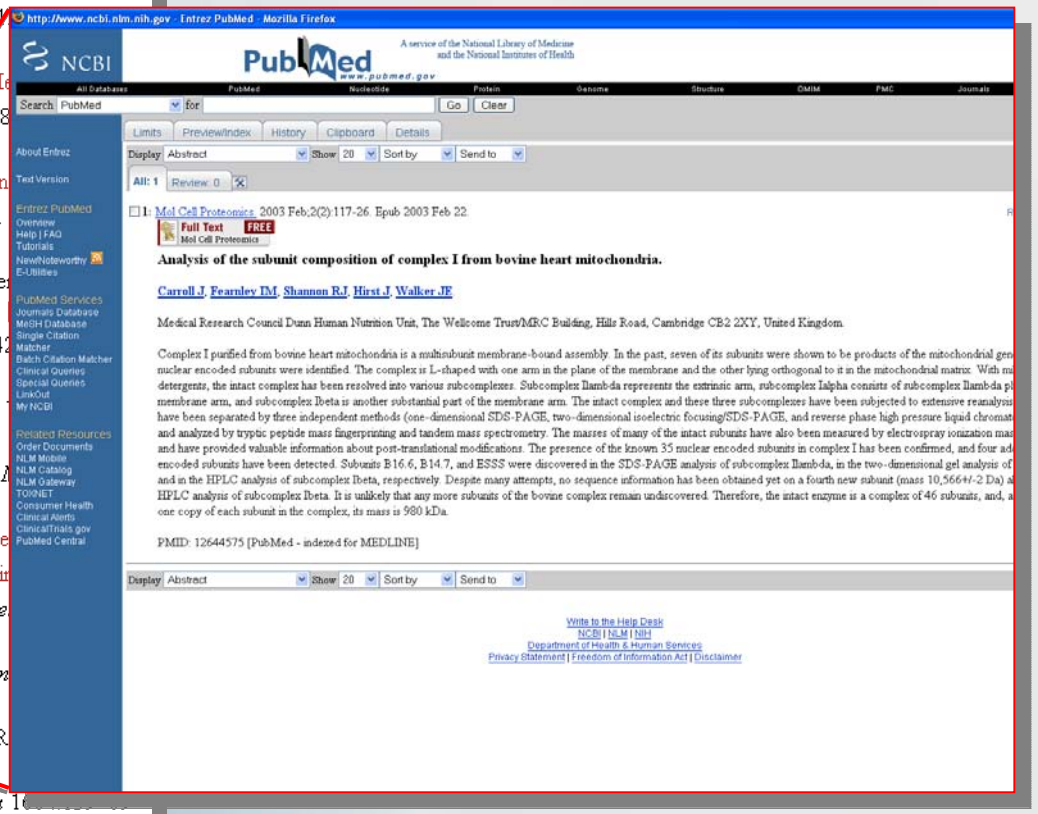

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Abstract: Complex I purified from bovine heart mitochondria is a multisubunit membrane-bound assembly. In the past, seven of its subunits were shown to be products of the mitochondrial genome, and 35 nuclear encoded subunits were identified. The complex is L-shaped with one arm in the plane of the membrane and the other lying orthogonal to it in the mitochondrial matrix. With mildly chaotropic detergents, the intact complex has been resolved into various subcomplexes. Subcomplex Ilambda represents the extrinsic arm, subcomplex Ialpha consists of subcomplex Ilambda plus part of the membrane arm, and subcomplex Ibeta is another substantial part of the membrane arm. The intact complex and these three subcomplexes have been subjected to extensive reanalysis. Their subunits have been separated by three independent methods (one-dimensional SDS-PAGE, two-dimensional isoelectric focusing/SDS-PAGE, and reverse phase high pressure liquid chromatography (HPLC)) and analyzed by tryptic peptide mass fingerprinting and tandem mass spectrometry. The masses of many of the intact subunits have also been measured by electrospray ionization mass spectrometry and have provided valuable information about post-translational modifications. The presence of the known 35 nuclear encoded subunits in complex I has been confirmed, and four additional nuclear encoded subunits have been detected. Subunits B16.6, B14.7, and ESSS were discovered in the SDS-PAGE analysis of subcomplex Ilambda, in the two-dimensional gel analysis of the intact complex, and in the HPLC analysis of subcomplex 1,6, respectively. Despite many attempts, no sequence information has been obtained yet on a fourth new subunit (mass 10,566+/-2 Da) also detected in the HPLC analysis of subcomplex Ibeta. It is unlikely that any more subunits of the bovine complex remain undiscovered. Therefore, the intact enzyme is a complex of 46 subunits, and, assuming there is one copy of each subunit in the complex, its mass is 980 kDa.

Addresses: Walker JE (reprint author), MRC, Dunn Human Nutr Unit, Hills Rd,Wellcome Trust MRC Bldg, Cambridge, CB2 2XY England
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Publisher: AMER SOC BIOCHEMISTRY MOLECULAR BIOLOGY INC, 9650 ROCKVILLE PIKE, BETHESDA, MD 20814-3996 USA

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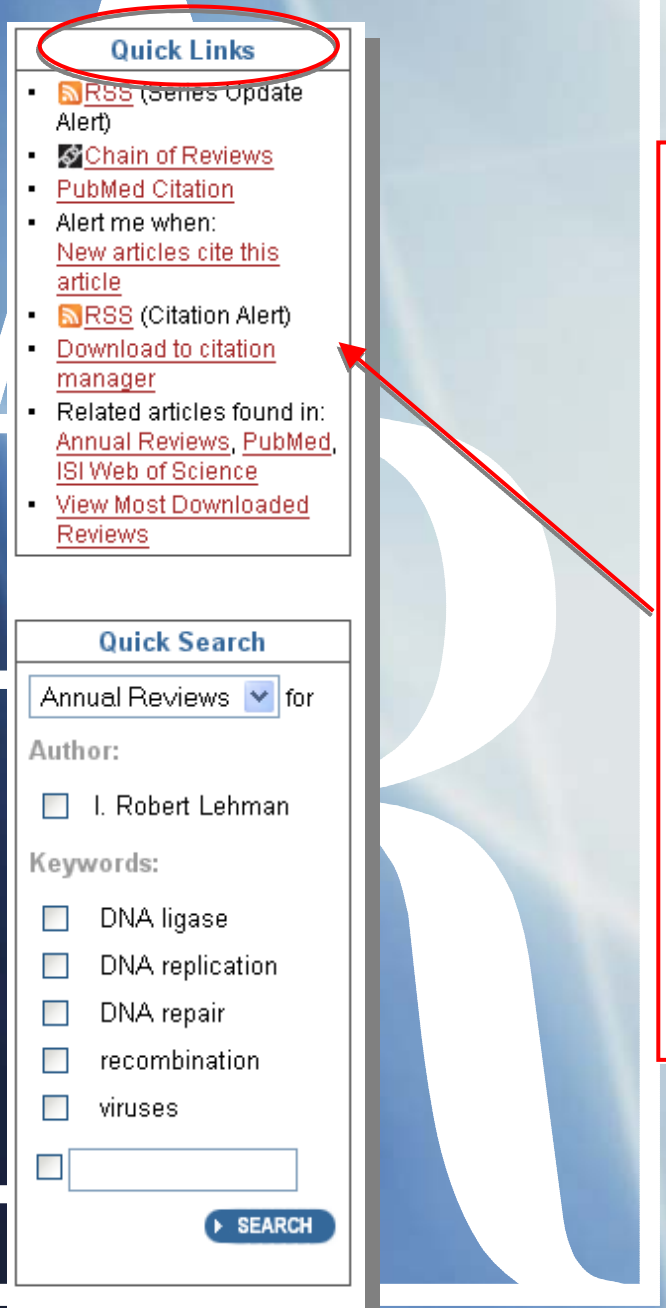

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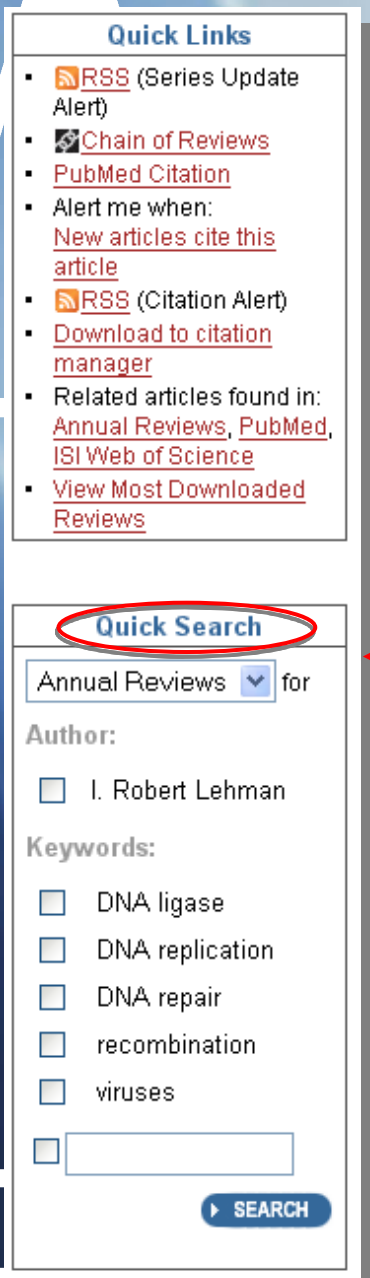

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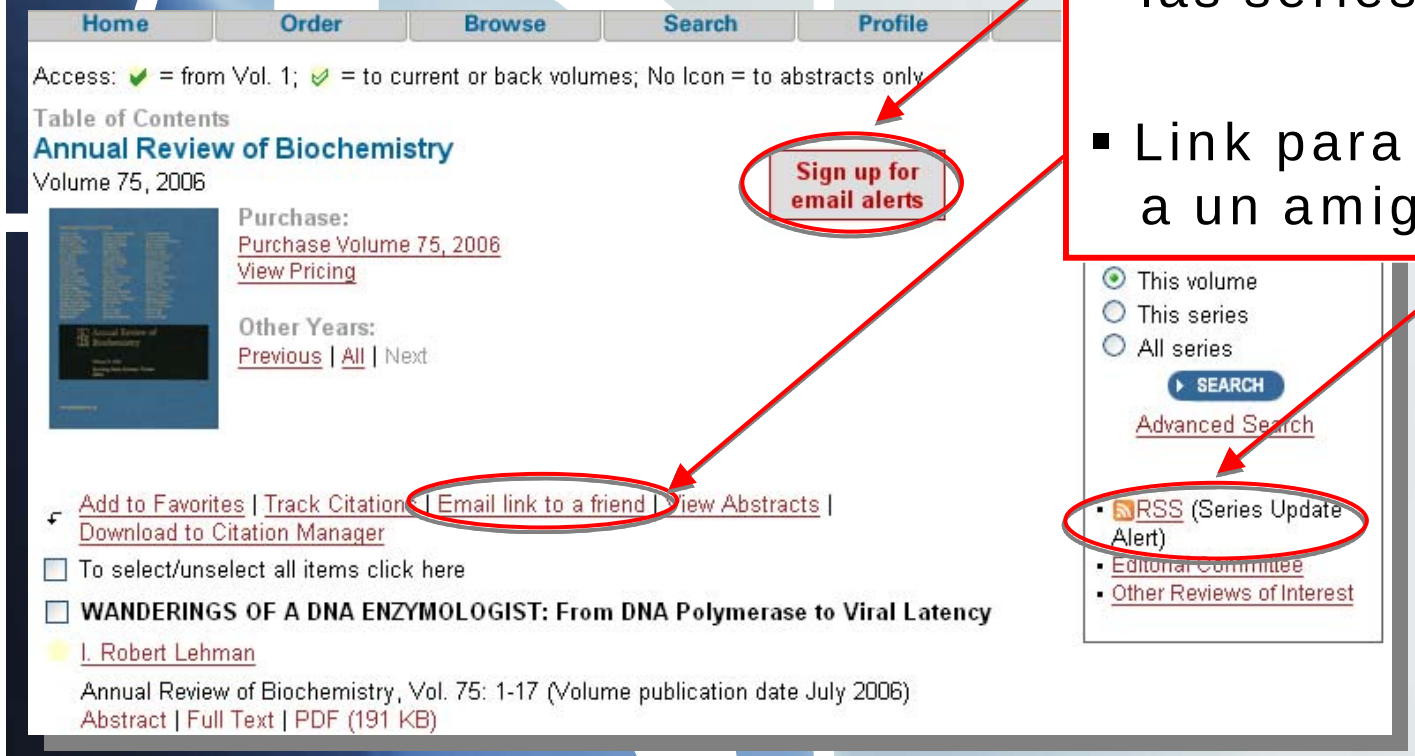

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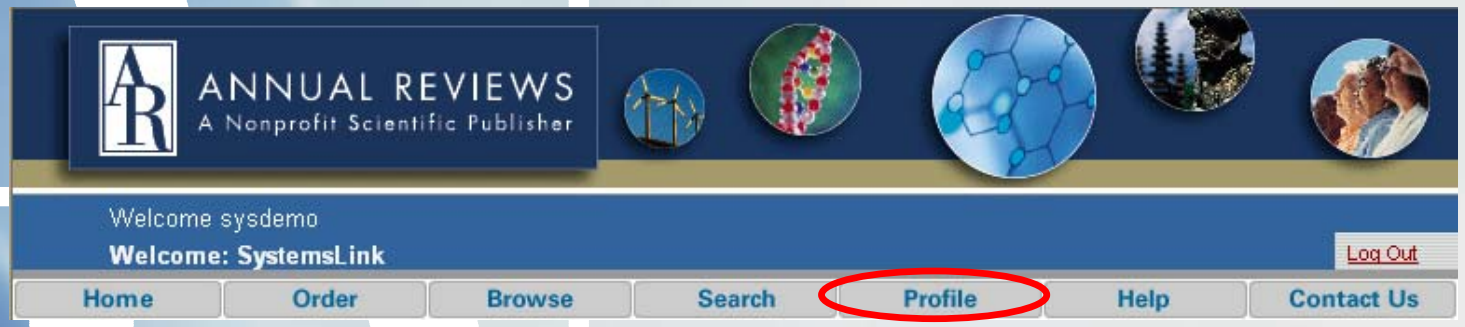

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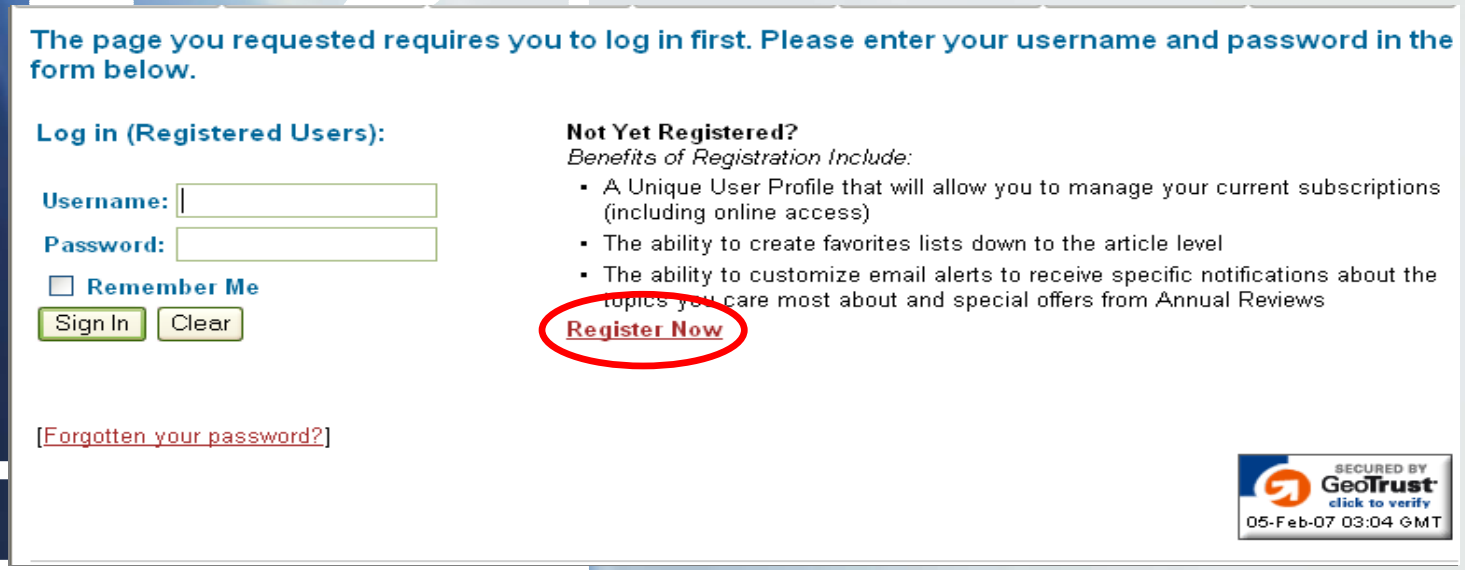

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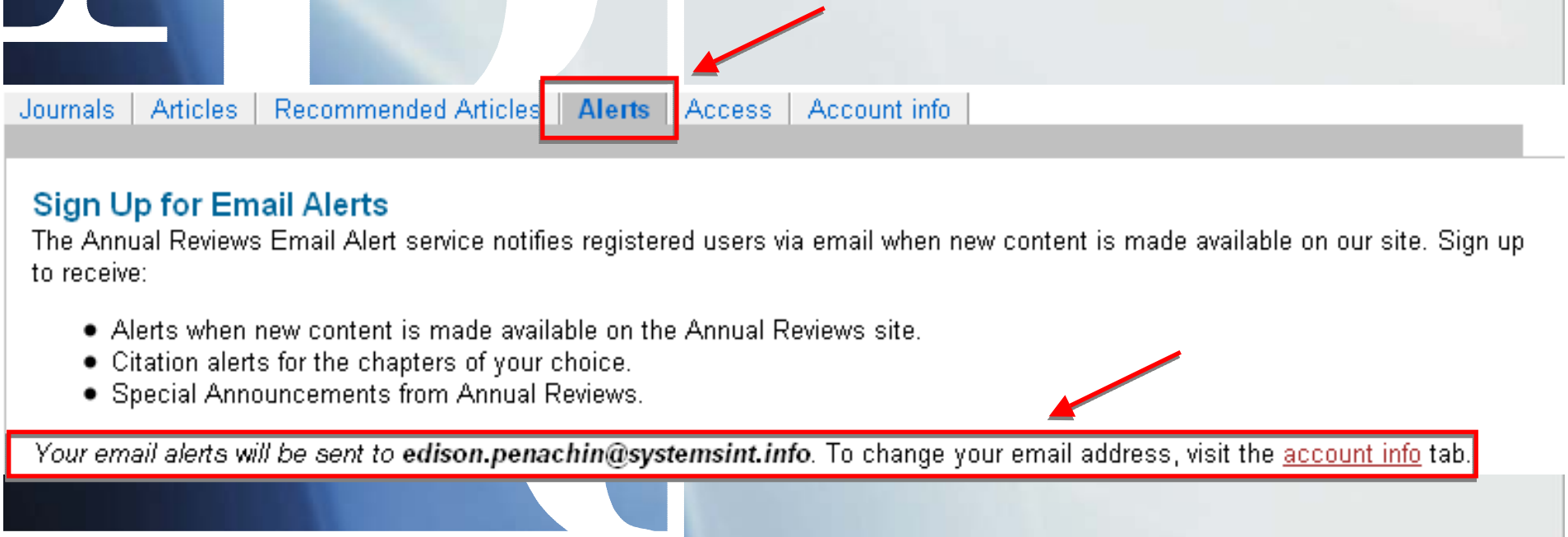

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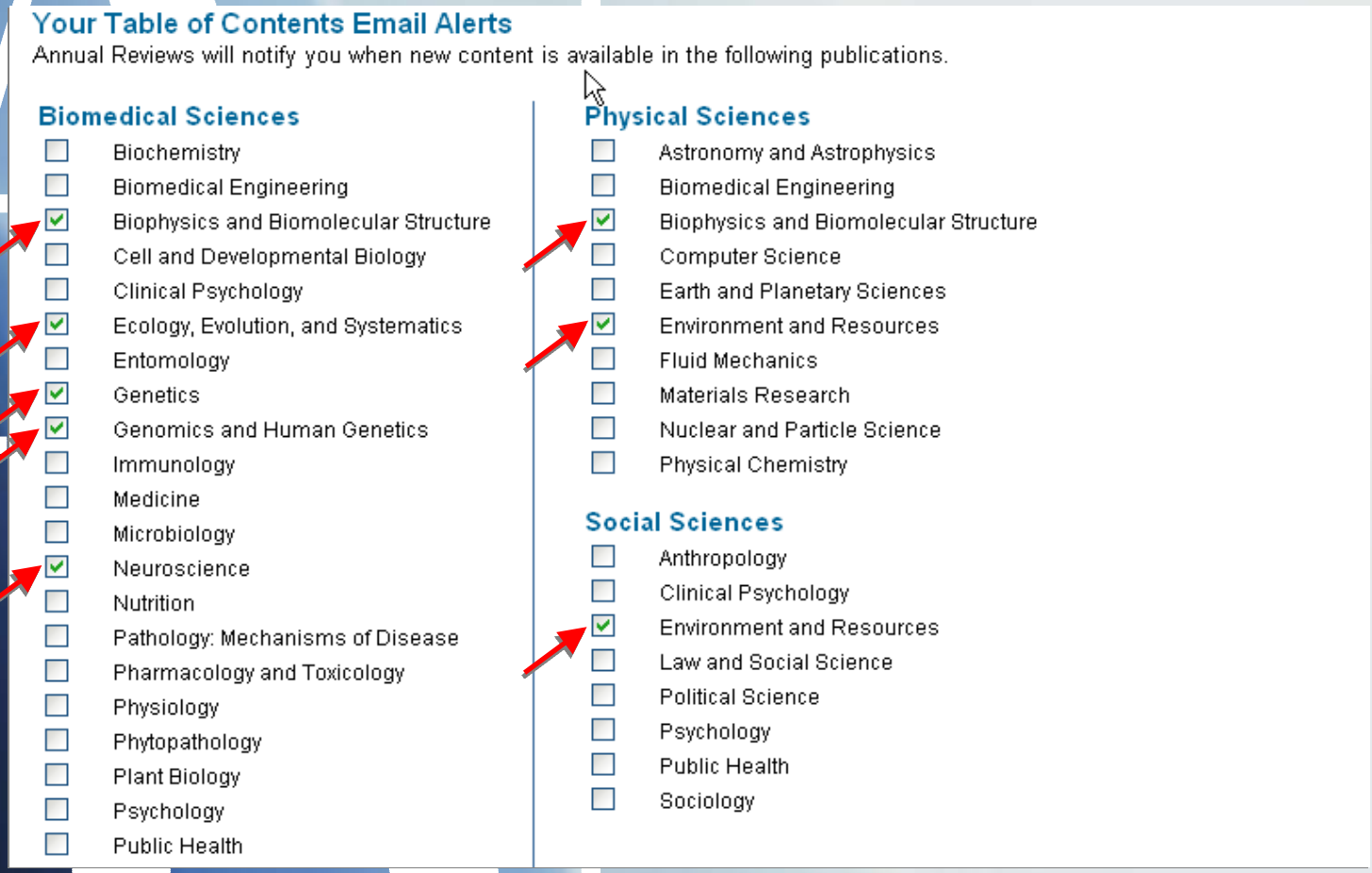

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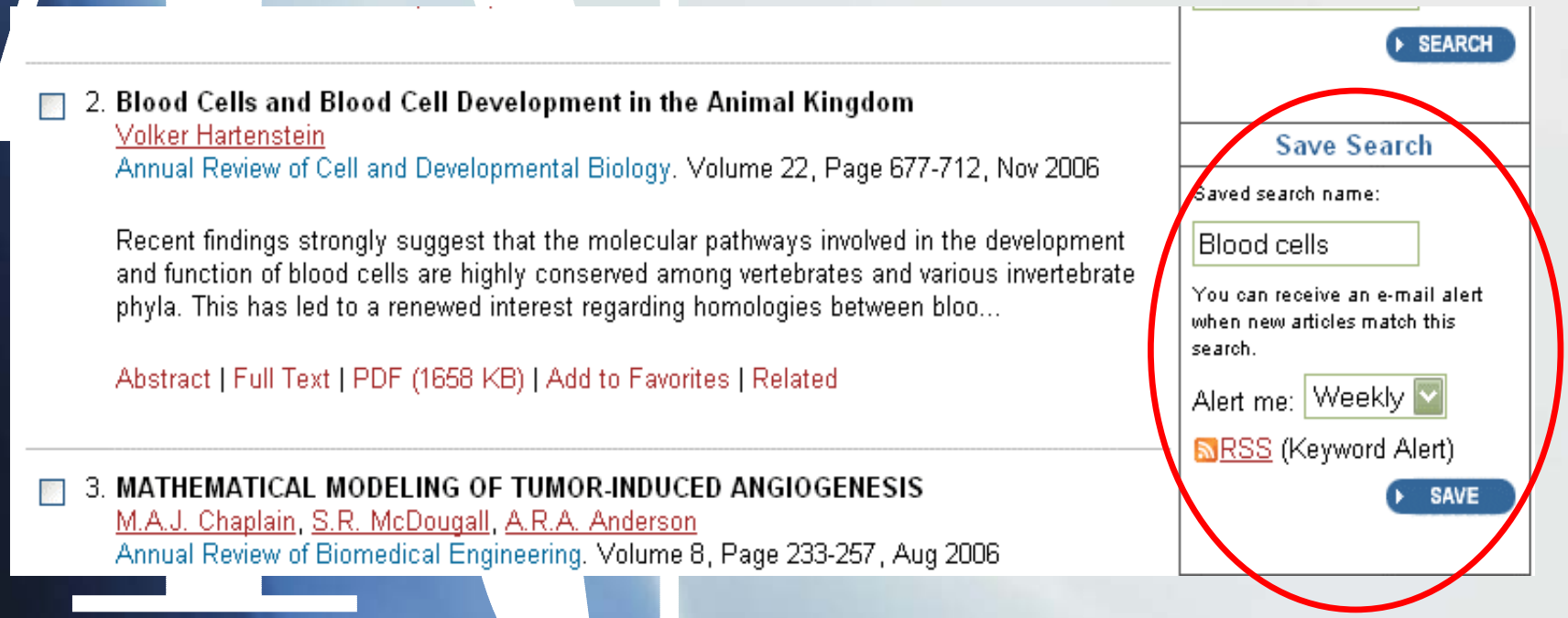

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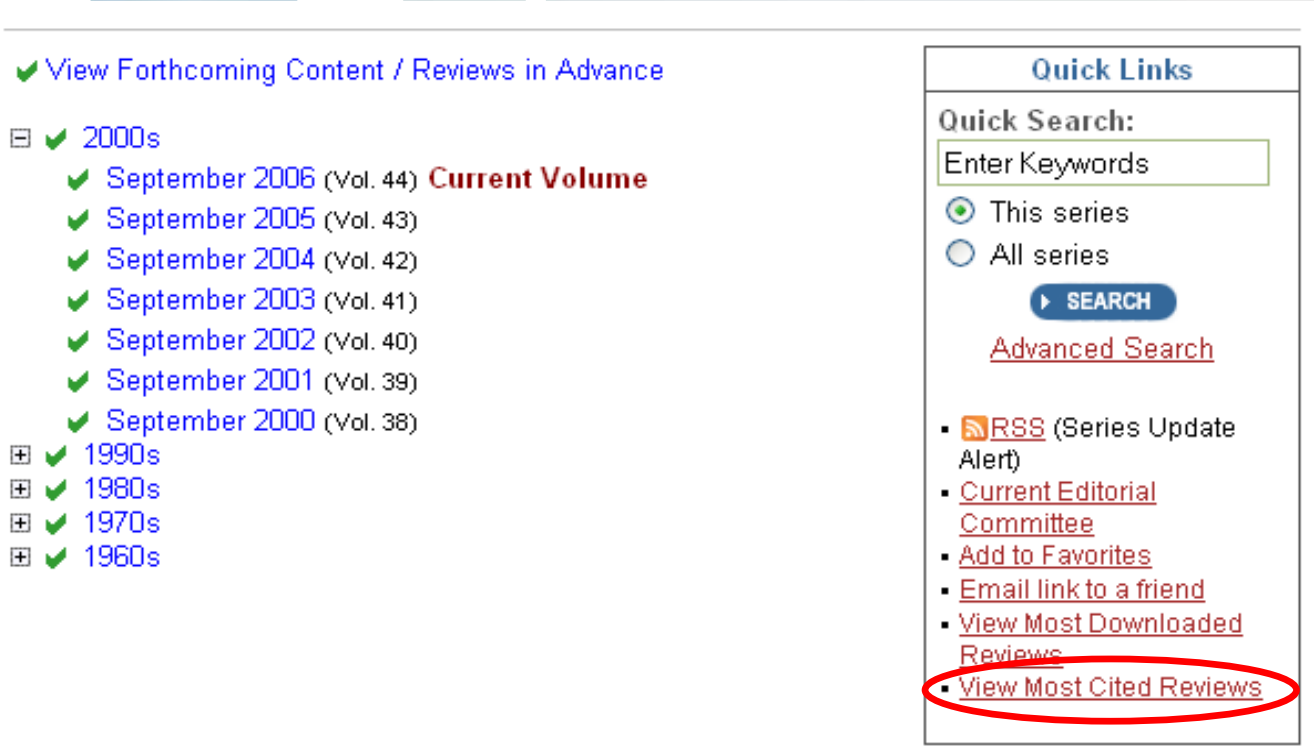

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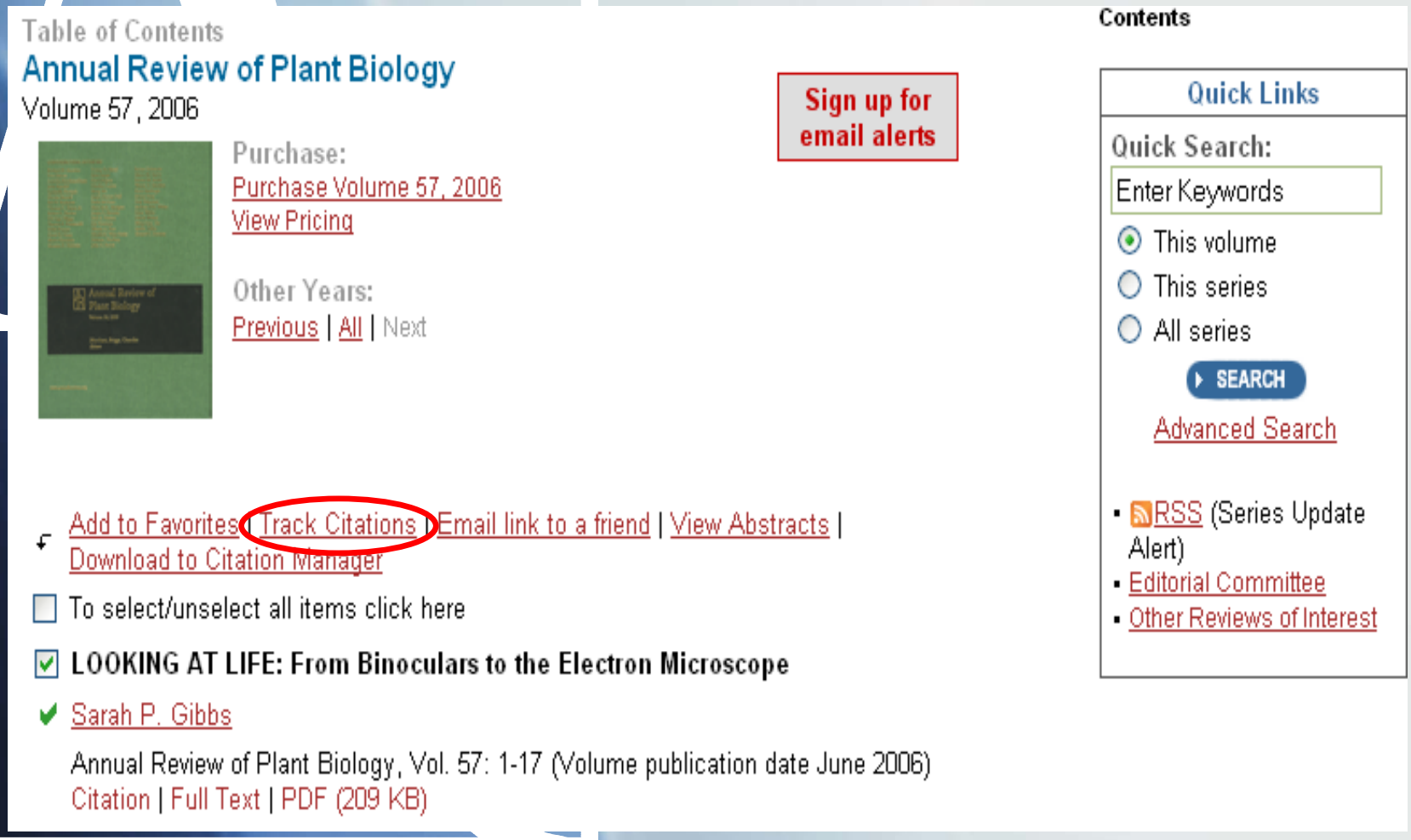

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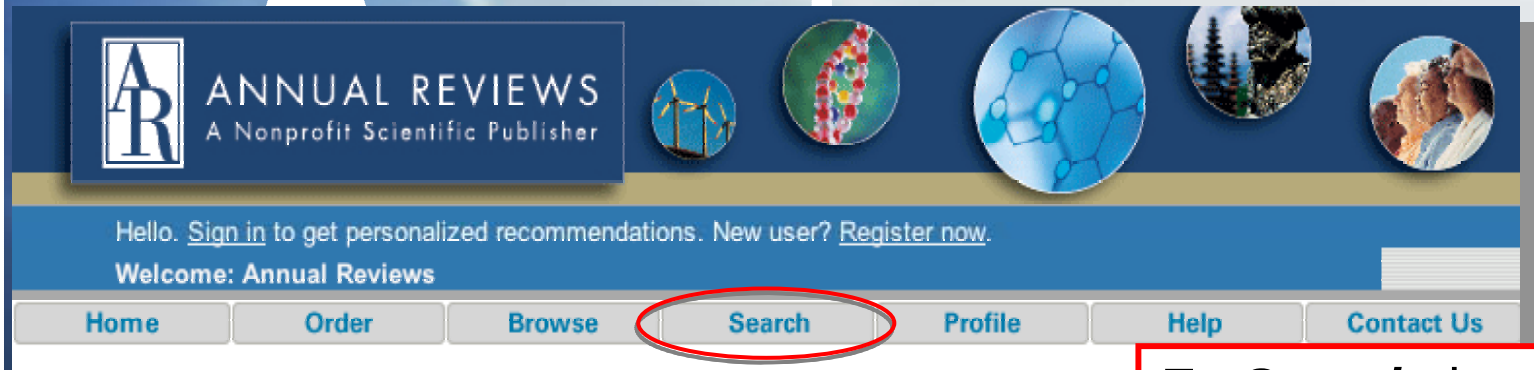

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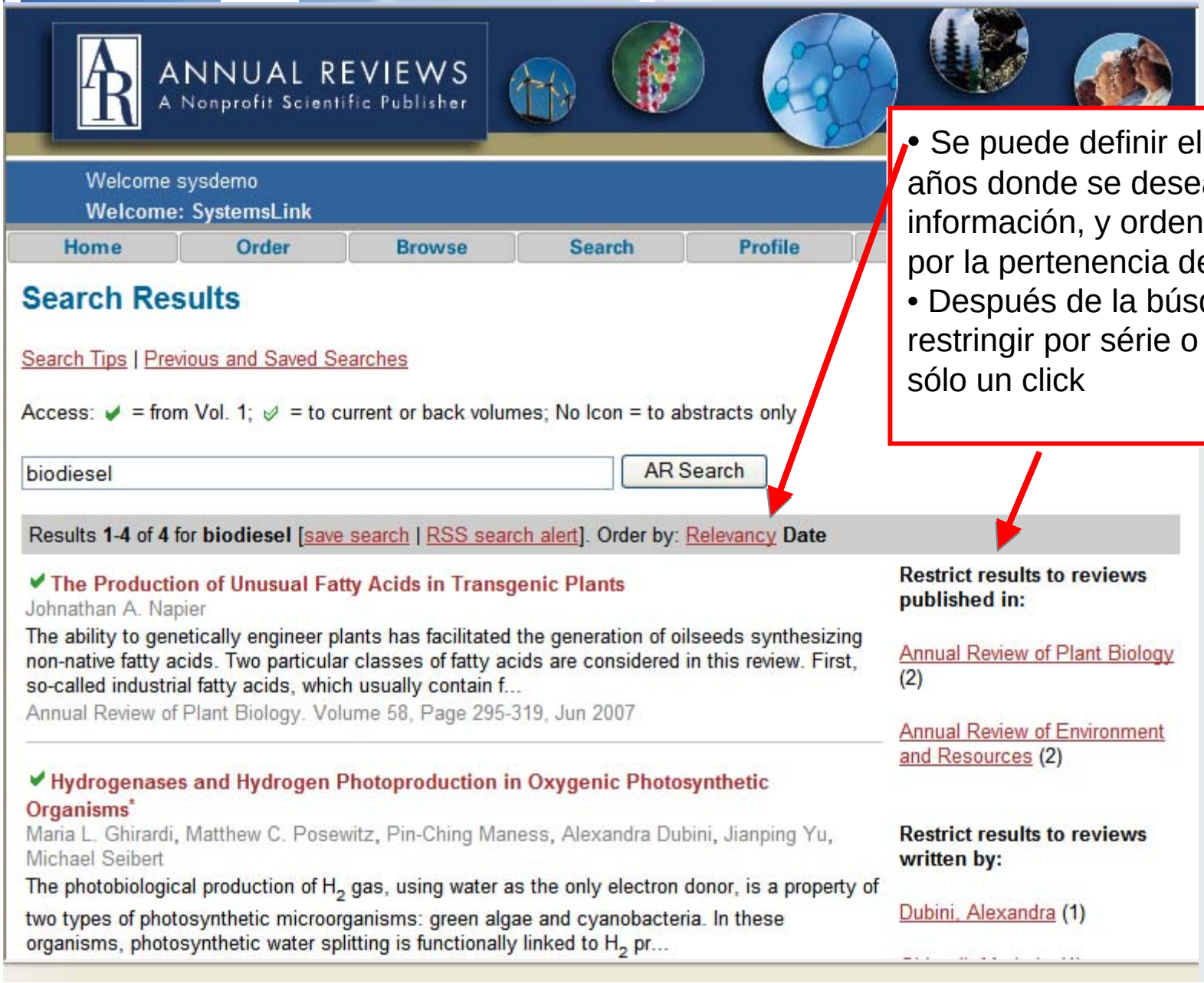

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Ejemplo de Búsqueda - Biodiesel

Annual Review of Plant Biology
Vol. 58: 71-91 (Volume publication date June 2007)
(doi:10.1146/annurev.arplant.58.032806.103848)
First published online as a Review in Advance on December 6, 2006

Hydrogenases and Hydrogen Photoproduction in Oxygenic Photosynthetic Organisms*

Maria L. Ghirardi,[1] Matthew C. Posewitz,[2] Pin-Ching Maness,[1] Alexandra Dubini,[1] Jianping Yu,[1] and Michael Seibert[1]

[1]National Renewable Energy Laboratory, Golden, Colorado 80401; email: maria_ghirardi@nrel.gov, pinching_maness@nrel.gov, alexandra_dubini@nrel.gov, jianping_yu@nrel.gov, mike_seibert@nrel.gov

[2]Colorado School of Mines, Environmental Science and Engineering Division, Golden, Colorado 80401; email: matthew_posewitz@nrel.gov

The photobiological production of H_2 gas, using water as the only electron donor, is a property of two types of photosynthetic microorganisms: green algae and cyanobacteria. In these organisms, photosynthetic water splitting is functionally linked to H_2 production by the activity of hydrogenase enzymes. Interestingly, each of these organisms contains only one of two major types of hydrogenases, [FeFe] or [NiFe] enzymes, which are phylogenetically distinct but perform the same catalytic reaction, suggesting convergent evolution. This idea is supported by the observation that each of the two classes of hydrogenases has a different metallo-cluster, is encoded by entirely different sets of genes (apparently under the control of different promoter elements), and exhibits different maturation pathways. The genetics, biosynthesis, structure, function, and O_2 sensitivity of these enzymes have been the focus of extensive research in recent years. Some of this effort is clearly driven by the potential for using these enzymes in future biological or biohybrid systems to produce renewable fuel or in fuel cell applications.

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Ejemplo de Búsqueda - Leptina

body weight and leptin | AR Search

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✔ **LEPTIN**
Rexford S. Ahima, Jeffrey S. Flier
The discovery of the adipose-derived hormone leptin has generated enormous interest in the interaction between peripheral signals and brain targets involved in the regulation of feeding and energy balance. Plasma leptin levels correlate with fat stores an...
Annual Review of Physiology. Volume 62, Page 413-437, Mar 2000

✔ **EFFECTS OF NEUROPEPTIDES AND LEPTIN ON NUTRIENT PARTITIONING: Dysregulations in Obesity**
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Body weight homeostasis is maintained via a series of complex interactions that occur between the brain (particularly the hypothalamus) and the periphery, notably via the hormone leptin, which is synthesized in and secreted from adipose tissue. Under norm...
Annual Review of Medicine. Volume 52, Page 339-351, Feb 2001

✔ **COMMON ENDOCRINE CONTROL OF BODY WEIGHT, REPRODUCTION, AND BONE MASS**
Shu Takeda, Florent Elefteriou, Gerard Karsenty
Bone mass is maintained constant between puberty and menopause by the balance between osteoblast and osteoclast activity. The existence of a hormonal control of osteoblast activity has been speculated for years by analogy to osteoclast biology. Through th...
Annual Review of Nutrition. Volume 23, Page 403-411, Jul 2003

✔ **FOOD INTAKE AND THE REGULATION OF BODY WEIGHT**
Stephen C. Woods, Michael W. Schwartz, Denis G. Baskin, Randy J. Seeley
This chapter reviews the recent literature on hormonal and neural signals critical to the regulation of individual meals and body fat. Rather than eating in response to acute energy deficits, animals eat when environmental conditions (social and learned f...
Annual Review of Psychology. Volume 51, Page 255-277, Feb 2000

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Resultado de Búsqueda - Leptina

Abstract

Annual Review of Psychology
Vol. 51: 255-277 (Volume publication date February 2000)
(doi:10.1146/annurev.psych.51.1.255)

FOOD INTAKE AND THE REGULATION OF BODY WEIGHT

Stephen C. Woods[1] Michael W. Schwartz[2] Denis G. Baskin[2] and Randy J. Seeley[1]

[1]Department of Psychiatry, University of Cincinnati Medical Center, Cincinnati, Ohio, 45267, email: steve.woods@psychiatry.uc.edu

[2]Division of Metabolism, Endocrinology and Nutrition, Department of Medicine, University of Washington, and the Puget Sound Veterans Administration Health Care System, Seattle, Washington, 98195,

This chapter reviews the recent literature on hormonal and neural signals critical to the regulation of individual meals and **body** fat. Rather than eating in response to acute energy deficits, animals eat when environmental conditions (social and learned factors, food availability, opportunity, etc.) are optimal. Hence, eating patterns are idiosyncratic. Energy homeostasis, the long-term matching of food intake to energy expenditure, is accomplished via controls over the size of meals. Individuals who have not eaten sufficient food to maintain their normal **weight** have lower levels of adiposity signals (**leptin** and insulin) in the blood and brain, and one consequence is that meal-generated signals (such as CCK) are less efficacious at reducing meal size. The converse is true if individuals are above their normal **weight**, when they tend to eat smaller meals. The final section reviews how these signals are received and integrated by the CNS, as well as the neural circuits and transmitters involved.

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Resultado de Busca - Leptina

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Altered Expression of SOCS3 in the Hypothalamic Arcuate Nucleus during Seasonal Body Mass Changes in the Field Vole, Microtus agrestis
E. Król, A. Tups, Z. A. Archer, A. W. Ross, K. M. Moar, L. M. Bell, J. S. Duncan, C. Mayer, P. J. Morgan, J. G. Mercer
Journal of Neuroendocrinology 19(2):83 (2007)
[CrossRef]

Nicotine regulates mRNA expression of feeding peptides in the arcuate nucleus in neonatal rat pups
L.Z. Huang, U.H. Winzer-Serhan
Developmental Neurobiology 67(3):363 (2007)
[CrossRef]

Intracerebroventricular Infusion of Leptin into Mature Merino Rams of Different Metabolic Status: Effects on Blood Concentrations of Glucose and Reproductive and Metabolic Hormones
P Celi, D Blache, MA Blackberry, GB Martin
Reproduction in Domestic Animals 41(1):79 (2006)
[CrossRef]

LMC International Food Congress 2006: Nutrigenomics and Health – From Vision to Food
Scandinavian Journal of Nutrition 50(0):3 (2006)
[CrossRef]

THE COW AS A MODEL TO STUDY FOOD INTAKE REGULATION
Michael S. Allen, Barry J. Bradford, Kevin J. Harvatine
Annual Review of Nutrition 25:523-547 (2005)
Abstract | Full Text | PDF (210 KB)

Authors:

- Stephen C. Woods
- Michael W. Schwartz
- Denis G. Baskin
- Randy J. Seeley

Keywords:

- satiety
- energy homeostasis
- neuropeptides
- leptin
- insulin
- hypothalamus

SEARCH

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