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THE CONVERGENCE OF BIOLOGY AND ENGINEERING

Discover the 21st Century's Technology Story with Dr. Susan Hockfield

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CLEAN ENERGY

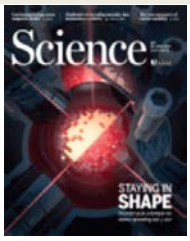
From the President: Planting the Seeds for Clean Energy

By **Susan Hockfield** (2008)

In this article Dr. Hockfield believes that an investment in energy research that could revolutionize the future of America in terms of environment, economy and security. To embrace a better future, it requires more innovative energy research, more sustainable energy technologies, and greater support from the federal government.

Source: MIT Technology Review

HEALTH CARE



Capitalizing on convergence for health care

By Phillip Sharp; Tyler Jacks; **Susan Hockfield** (2016)

With the Convergence approach, which integrates biology with engineering and sciences, emerging technologies are paving the way for huge opportunities in health care, economy, defense etc. This calls for significant investment in convergence revolution.

Source: Science

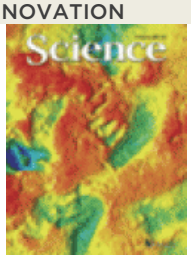
Convergence: The future of health

By Phillip Sharp; **Susan Hockfield** (2017)

The Convergence strategy is remarkably beneficial to the health care sector, with increasing quality of medical devices and services at affordable costs, more effective treatments, as well as expanding health-enhancing knowledge and skills.

Source: Science

INNOVATION



The Next Innovation Revolution

By **Susan Hockfield** (2009)

The investment in the Convergence research and education strategy that blends life sciences with engineering and physical sciences enables groundbreaking scientific and technological innovations in the 21st century.

Source: Science

MANUFACTURING

Source: Britannica ImageQuest

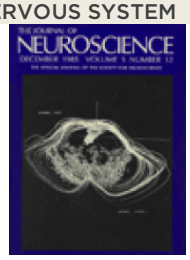
Manufacturing a Recovery

By **Susan Hockfield** (2011)

Relying on leading-edge science and engineering breakthroughs, high-tech advanced manufacturing plays a crucial role in flourishing the U.S. economy and boosting skilled work force. Thus, federal investments and well-educated labors are needed for innovative manufacturing.

Source: The New York Times

NERVOUS SYSTEM



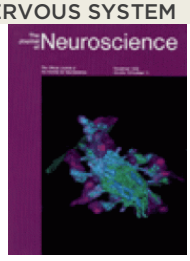
Identification of major cell classes in the developing mammalian nervous system

By **Susan Hockfield**; Ronald McKay (1985)

Monoclonal antibodies that can analyze the development process of cellular organization in nervous system were produced to identify key cell types during mammalian neurogenesis, so as to study the possible cellular mechanisms in the early stage of mammalian nervous system development.

Source: Journal of Neuroscience

NERVOUS SYSTEM



Protein tyrosine phosphatases expressed in the developing rat brain

By Mustafa Sahin; **Susan Hockfield** (1993)

Protein tyrosine phosphatases (PTPases) play a major role in transduction of cell surface events. In the study, a large amount of putative PTPase domains in brain were identified. PTPases mainly expressed in the developing cortex, and findings suggested that they are significant to the neuronal development.

Source: Journal of Neuroscience

NEURAL STRUCTURE

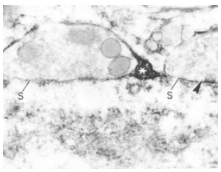
The role of polysialic acid and other carbohydrate polymers in neural structural plasticity

By Hugh JL Fryer; **Susan Hockfield** (1996)

Polysialic acid (PSA) is able to fit well into structural plasticity and absence of PSA will result in weakened structural plasticity. PSA may take the form of some large polymeric carbohydrates, which can alter structural plasticity by expanding intermolecular spacing through hydration.

Source: Current Opinion in Neurobiology

NEURONS



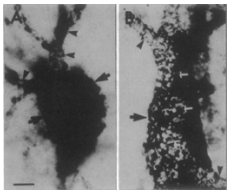
A surface antigen expressed by a subset of neurons in the vertebrate central nervous system

By **Susan Hockfield**; Ronald McKay (1983)

A surface antigen was located on a subset of mammalian central nervous system neurons, meaning more surface markers may exist on other subsets. Antibodies against these antigens may allow us to study the development and maintenance of synaptic connections in the central nervous system.

Source: PNAS

NEURONS

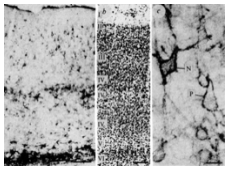


Molecular differences among neurons reveal an organization of human visual cortex

By **Susan Hockfield**; Roger Tootell; Sam Zaremba (1990)

Monoclonal antibody Cat-301 identified an antigen in human cortex closely related to that in laboratory animals. Cat-301 was further used to show an organization of molecularly defined neurons in human visual cortex. Findings indicate that a visual pathway in human cortex is homologous to the magnocellular pathway in macaque.

Source: PNAS



Monoclonal antibody that identifies subsets of neurones in the central visual system of monkey and cat

By S. H. C. Hendry; **Susan Hockfield**; E. G. Jones; R. McKay(1984)

Introducing an immunocytochemical study with a monoclonal antibody Cat-301, in which the antibody recognizes an uncharacterized antigen on surfaces of some neurones in certain layers of the monkey striate cortex, and in certain parts of the cat and monkey dorsal lateral geniculate nuclei (LGN).

Source: Nature

TECHNOLOGY

A New Century's New Technologies

By **Susan Hockfield** (2015)

The convergence of biology and engineering have vigorously driven innovations, given rise to emerging industries, and accelerated economic gains. It is this convergence that will help to address the global threats and challenges which includes technological innovations needed to supply clean energy, food, and water, as well as better health in 2050.

Source: Project Syndicate

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