

Stanford



Robert Sapolsky

John A. and Cynthia Fry Gunn Professor, Professor of Biology, of Neurology and of Neurosurgery

Bio

ACADEMIC APPOINTMENTS

- Professor, Biology
- Professor, Neurology
- Professor, Neurosurgery
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Neuron death, stress, gene therapy

Teaching

COURSES

2023-24

- Human Behavioral Biology: BIO 150, HUMBIO 160 (Spr)
- Mechanisms of Neuron Death: BIO 151 (Aut)
- Physiology: BIO 84 (Win)

2022-23

- Mechanisms of Neuron Death: BIO 151 (Aut)
- Physiology: BIO 84 (Win)

2021-22

- Human Behavioral Biology: BIO 150, HUMBIO 160 (Spr)
- Mechanisms of Neuron Death: BIO 151 (Aut)
- Physiology: BIO 84 (Win)

2020-21

- Mechanisms of Neuron Death: BIO 151 (Aut)
- Physiology: BIO 84 (Win)

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)
- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **This Is Your Brain on Nationalism The Biology of Us and Them** *FOREIGN AFFAIRS*
Sapolsky, R.
2019; 98 (2): 42–47
- **Doubled-Edged Swords in the Biology of Conflict** *FRONTIERS IN PSYCHOLOGY*
Sapolsky, R. M.
2018; 9
- **THE HEALTH-WEALTH GAP** *SCIENTIFIC AMERICAN*
Sapolsky, R. M.
2018; 319 (5): 63–67
- **Speculations on the Evolutionary Origins of System Justification** *EVOLUTIONARY PSYCHOLOGY*
Jost, J. T., Sapolsky, R. M., Nam, H.
2018; 16 (2): 1474704918765342
- **The mTOR cell signaling pathway is crucial to the long-term protective effects of ischemic postconditioning against stroke.** *Neuroscience letters*
Wang, P., Xie, R., Cheng, M., Sapolsky, R., Ji, X., Zhao, H.
2018; 676: 58–65
- **Adult-generated neurons born during chronic social stress are uniquely adapted to respond to subsequent chronic social stress.** *Molecular psychiatry*
De Miguel, Z., Haditsch, U., Palmer, T. D., Azpiroz, A., Sapolsky, R. M.
2018
- **Psychiatric distress in animals versus animal models of psychiatric distress** *NATURE NEUROSCIENCE*
Sapolsky, R. M.
2016; 19 (11): 1387-1389
- **Stress and the brain: individual variability and the inverted-U** *NATURE NEUROSCIENCE*
Sapolsky, R. M.
2015; 18 (10): 1344-1346
- **Stress and glucocorticoids promote oligodendrogenesis in the adult hippocampus** *MOLECULAR PSYCHIATRY*
Chetty, S., Friedman, A. R., Taravosh-Lahn, K., Kirby, E. D., Mirescu, C., Guo, F., Krupik, D., Nicholas, A., Geraghty, C., Krishnamurthy, A., Tsai, M., Covarrubias, D., Wong, et al
2014; 19 (12): 1275-1283
- **Toxoplasma gondii Is Dependent on Glutamine and Alters Migratory Profile of Infected Host Bone Marrow Derived Immune Cells through SNAT2 and CXCR4 Pathways** *PLOS ONE*
Lee, I., Evans, A. K., Yang, C., Works, M. G., Kumar, V., De Miguel, Z., Manley, N. C., Sapolsky, R. M.
2014; 9 (10)
- **Mammalian Target of Rapamycin Cell Signaling Pathway Contributes to the Protective Effects of Ischemic Postconditioning Against Stroke** *STROKE*
Xie, R., Wang, P., Cheng, M., Sapolsky, R., Ji, X., Zhao, H.
2014; 45 (9): 2769-?
- **Toxoplasma gondii influences aversive behaviors of female rats in an estrus cycle dependent manner** *PHYSIOLOGY & BEHAVIOR*
Golcu, D., Gebre, R. Z., Sapolsky, R. M.
2014; 135: 98-103

- **Glucocorticoids increase excitotoxic injury and inflammation in the hippocampus of adult male rats.** *Neuroendocrinology*
Sorrells, S. F., Munhoz, C. D., Manley, N. C., Yen, S., Sapolsky, R. M.
2014; 100 (2-3): 129-140
- **Akt isoforms differentially protect against stroke-induced neuronal injury by regulating mTOR activities** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
Xie, R., Cheng, M., Li, M., Xiong, X., Daadi, M., Sapolsky, R. M., Zhao, H.
2013; 33 (12): 1875-1885
- **Early Postnatal Handling Alters Glucocorticoid Receptor Concentrations in Selected Brain Regions** *BEHAVIORAL NEUROSCIENCE*
Meaney, M. J., Aitken, D. H., Bodnoff, S. R., Iny, L. J., Tatarewicz, J. E., Sapolsky, R. M.
2013; 127 (5): 637-641
- **Soluble TNF receptor 1-secreting ex vivo-derived dendritic cells reduce injury after stroke** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
Works, M. G., Koenig, J. B., Sapolsky, R. M.
2013; 33 (9): 1376-1385
- **Spatial Memory and Long-Term Object Recognition Are Impaired by Circadian Arrhythmia and Restored by the GABA(A)Antagonist Pentylentetrazole** *PLOS ONE*
Ruby, N. F., Fernandez, F., Garrett, A., Klima, J., Zhang, P., Sapolsky, R., Heller, H. C.
2013; 8 (8)
- **Glucocorticoid signaling in myeloid cells worsens acute CNS injury and inflammation.** *journal of neuroscience*
Sorrells, S. F., Caso, J. R., Munhoz, C. D., Hu, C. K., Tran, K. V., Miguel, Z. D., Chien, B. Y., Sapolsky, R. M.
2013; 33 (18): 7877-7889
- **Derivation of Injury-Responsive Dendritic Cells for Acute Brain Targeting and Therapeutic Protein Delivery in the Stroke-Injured Rat** *PLOS ONE*
Manley, N. C., Caso, J. R., Works, M. G., Cutler, A. B., Zemlyak, I., Sun, G., Munhoz, C. D., Chang, S., Sorrells, S. F., Ermini, F. V., Decker, J. H., Bertrand, A. A., Dinkel, et al
2013; 8 (4)
- **Toxoplasma gondii infection induces dendritic retraction in basolateral amygdala accompanied by reduced corticosterone secretion** *DISEASE MODELS & MECHANISMS*
Mitra, R., Sapolsky, R. M., Vyas, A.
2013; 6 (2): 516-520
- **Treponema pallidum Infection in the Wild Baboons of East Africa: Distribution and Genetic Characterization of the Strains Responsible** *PLOS ONE*
Harper, K. N., Fyumagwa, R. D., Hoare, R., Wambura, P. N., Coppenhaver, D. H., Sapolsky, R. M., Alberts, S. C., Tung, J., Rogers, J., Kilewo, M., Batamuzi, E. K., Leendertz, F. H., Armelagos, et al
2012; 7 (12)
- **Corticosterone treatment impairs auditory fear learning and the dendritic morphology of the rat inferior colliculus** *HEARING RESEARCH*
Dagnino-Subiabre, A., Angel Perez, M., Terreros, G., Cheng, M. Y., House, P., Sapolsky, R.
2012; 294 (1-2): 104-113
- **Importance of a sense of control and the physiological benefits of leadership** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Sapolsky, R. M.
2012; 109 (44): 17730-17731
- **Super Humanity** *SCIENTIFIC AMERICAN*
Sapolsky, R. M.
2012; 307 (3): 40-43
- **Short-Term Enrichment Makes Male Rats More Attractive, More Defensive and Alters Hypothalamic Neurons** *PLOS ONE*
Mitra, R., Sapolsky, R. M.
2012; 7 (5)
- **Basolateral amygdala regulation of adult hippocampal neurogenesis and fear-related activation of newborn neurons** *MOLECULAR PSYCHIATRY*
Kirby, E. D., Friedman, A. R., Covarrubias, D., Ying, C., Sun, W. G., Goosens, K. A., Sapolsky, R. M., Kaufers, D.

2012; 17 (5): 527-536

- **Prokineticin 2 is an endangering mediator of cerebral ischemic injury** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Cheng, M. Y., Lee, A. G., Culbertson, C., Sun, G., Talati, R. K., Manley, N. C., Li, X., Zhao, H., Lyons, D. M., Zhou, Q., Steinberg, G. K., Sapolsky, R. M.
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- **Protozoan Parasite *Toxoplasma gondii* Manipulates Mate Choice in Rats by Enhancing Attractiveness of Males** *PLOS ONE*
Dass, S. A., Vasudevan, A., Dutta, D., Soh, L. J., Sapolsky, R. M., Vyas, A.
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- **Predator Cat Odors Activate Sexual Arousal Pathways in Brains of *Toxoplasma gondii* Infected Rats** *PLOS ONE*
House, P. K., Vyas, A., Sapolsky, R.
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- **Sympathy for the CEO** *SCIENCE*
Sapolsky, R. M.
2011; 333 (6040): 293-294
- **Transient Gastric Irritation in the Neonatal Rats Leads to Changes in Hypothalamic CRF Expression, Depression- and Anxiety-Like Behavior as Adults** *PLOS ONE*
Liu, L., Li, Q., Sapolsky, R., Liao, M., Mehta, K., Bhargava, A., Pasricha, P. J.
2011; 6 (5)
- **An Insult-Inducible Vector System Activated by Hypoxia and Oxidative Stress for Neuronal Gene Therapy** *TRANSLATIONAL STROKE RESEARCH*
Cheng, M. Y., Lee, I., Jin, M., Sun, G., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
2011; 2 (1): 92-100
- **RNAi-mediated Knockdown of Injury-induced Prokineticin 2 And Its Effects On Neuron Death** *International Stroke Conference*
Cheng, M. Y., Culbertson, C., Lee, A. G., Manley, N., Sun, G., Steinberg, G. K., Sapolsky, R. M.
LIPPINCOTT WILLIAMS & WILKINS.2011: E141-E141
- **Male African elephants (*Loxodonta africana*) queue when the stakes are high** *ETHOLOGY ECOLOGY & EVOLUTION*
O'Connell-Rodwell, C. E., Wood, J. D., KINZLEY, C., Rodwell, T. C., ALARCON, C., Wasser, S. K., Sapolsky, R.
2011; 23 (4): 388-397
- **Glucocorticoids Exacerbate Lipopolysaccharide-Induced Signaling in the Frontal Cortex and Hippocampus in a Dose-Dependent Manner** *JOURNAL OF NEUROSCIENCE*
Munhoz, C. D., Sorrells, S. F., Caso, J. R., Scavone, C., Sapolsky, R. M.
2010; 30 (41): 13690-13698
- **Gene therapy in rodent amygdala against fear disorders** *EXPERT OPINION ON BIOLOGICAL THERAPY*
Mitra, R., Sapolsky, R. M.
2010; 10 (9): 1289-1303
- **Expression of chimeric estrogen-glucocorticoid-receptor in the amygdala reduces anxiety** *BRAIN RESEARCH*
Mitra, R., Sapolsky, R. M.
2010; 1342: 33-38
- **Neighbor effects of neurons bearing protective transgenes** *BRAIN RESEARCH*
Lee, A. L., Campbell, L. B., Sapolsky, R. M.
2010; 1339: 70-75
- **Manipulation of host behaviour by *Toxoplasma gondii*: what is the minimum a proposed proximate mechanism should explain?** *FOLIA PARASITOLOGICA*
Vyas, A., Sapolsky, R.
2010; 57 (2): 88-94
- **Anti-Glucocorticoid Gene Therapy Reverses the Impairing Effects of Elevated Corticosterone on Spatial Memory, Hippocampal Neuronal Excitability, and Synaptic Plasticity** *JOURNAL OF NEUROSCIENCE*
Dumas, T. C., Gillette, T., Ferguson, D., Hamilton, K., Sapolsky, R. M.

2010; 30 (5): 1712-1720

- **Evidence for caspase effects on release of cytochrome c and AIF in a model of ischemia in cortical neurons** *NEUROSCIENCE LETTERS*
Singh, M. H., Brooke, S. M., Zemlyak, I., Sapolsky, R. M.
2010; 469 (2): 179-183
- **Glucocorticoids can arm macrophages for innate immune battle** *BRAIN BEHAVIOR AND IMMUNITY*
Sorrells, S. F., Sapolsky, R. M.
2010; 24 (1): 17-18
- **Changes in Brain MicroRNAs Contribute to Cholinergic Stress Reactions** *13th International Symposium on Cholinergic Mechanisms*
Meerson, A., Cacheaux, L., Goosens, K. A., Sapolsky, R. M., Soreq, H., Kaufer, D.
HUMANA PRESS INC.2010: 47-55
- **Resilience against predator stress and dendritic morphology of amygdala neurons** *BEHAVIOURAL BRAIN RESEARCH*
Mitra, R., Adamec, R., Sapolsky, R.
2009; 205 (2): 535-543
- **The microtubule interacting drug candidate NAP protects against kainic acid toxicity in a rat model of epilepsy** *JOURNAL OF NEUROCHEMISTRY*
Zemlyak, I., Manley, N., Vulih-Shultzman, I., Cutler, A. B., Graber, K., Sapolsky, R. M., Gozes, I.
2009; 111 (5): 1252-1263
- **NAP protects against cyanide-related microtubule destruction** *Inter-Academic Symposium on Neurobiology of Neuro-Psychiatric Diseases*
Zemlyak, I., Sapolsky, R., Gozes, I.
SPRINGER WIEN.2009: 1411-16
- **The Stressed CNS: When Glucocorticoids Aggravate Inflammation** *NEURON*
Sorrells, S. F., Caso, J. R., Munhoz, C. D., Sapolsky, R. M.
2009; 64 (1): 33-39
- **Mineralocorticoid Receptor Overexpression in Basolateral Amygdala Reduces Corticosterone Secretion and Anxiety** *BIOLOGICAL PSYCHIATRY*
Mitra, R., Ferguson, D., Sapolsky, R. M.
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- **NAP protects against cytochrome c release: Inhibition of the initiation of apoptosis** *EUROPEAN JOURNAL OF PHARMACOLOGY*
Zemlyak, I., Sapolsky, R., Gozes, I.
2009; 618 (1-3): 9-14
- **SK2 potassium channel overexpression in basolateral amygdala reduces anxiety, stress-induced corticosterone secretion and dendritic arborization** *MOLECULAR PSYCHIATRY*
Mitra, R., Ferguson, D., Sapolsky, R. M.
2009; 14 (9): 847-855
- **Effects of overexpression of antioxidants on the release of cytochrome c and apoptosis-inducing factor in the model of ischemia** *NEUROSCIENCE LETTERS*
Zemlyak, I., Brooke, S. M., Singh, M. H., Sapolsky, R. M.
2009; 453 (3): 182-185
- **Prokineticin 2 Exacerbates Cerebral Ischemic Injury In Rats** *American-Association-International-Stroke Conference 2009*
Cheng, M. Y., Lee, A. G., Sun, G., Zhao, H., Zhou, Q., Steinberg, G., Sapolsky, R.
LIPPINCOTT WILLIAMS & WILKINS.2009: E213-E213
- **Disruption of Fear Memory Through Dual-Hormone Gene Therapy** *BIOLOGICAL PSYCHIATRY*
Rodrigues, S. M., Sapolsky, R. M.
2009; 65 (5): 441-444
- **Blocking glucocorticoid and enhancing estrogenic genomic signaling protects against cerebral ischemia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
Cheng, M. Y., Sun, G., Jin, M., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
2009; 29 (1): 130-136

- **The Influence of Stress Hormones on Fear Circuitry** *ANNUAL REVIEW OF NEUROSCIENCE*
Rodrigues, S. M., LeDoux, J. E., Sapolsky, R. M.
2009; 32: 289-313
- **Effects of enrichment predominate over those of chronic stress on fear-related behavior in male rats** *STRESS-THE INTERNATIONAL JOURNAL ON THE BIOLOGY OF STRESS*
Mitra, R., Sapolsky, R. M.
2009; 12 (4): 305-312
- **Hippocampal-dependent learning requires a functional circadian system** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Ruby, N. F., Hwang, C. E., Wessells, C., Fernandez, F., Zhang, P., Sapolsky, R., Heller, H. C.
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- **Viral vector-mediated blockade of the endocrine stress-response modulates non-spatial memory** *NEUROSCIENCE LETTERS*
Ferguson, D., Lin, S., Sapolsky, R.
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- **Acute corticosterone treatment is sufficient to induce anxiety and amygdaloid dendritic hypertrophy** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Mitra, R., Sapolsky, R. M.
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Ju, K. L., Manley, N. C., Sapolsky, R. M.
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- **Hypothermia blacks beta-catenin degradation after focal ischemia in rats** *BRAIN RESEARCH*
Zhang, H., Ren, C., Gao, X., Takahashi, T., Sapolsky, R. M., Steinberg, G. K., Zhao, H.
2008; 1198: 182-187
- **An insult-inducible vector system activated by hypoxia inducible factor 1 (hif1) and reactive oxygen species** *33rd International Stroke Conference*
Cheng, M., Jin, M., Lee, I., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
LIPPINCOTT WILLIAMS & WILKINS.2008: 727-28
- **Overexpression of Mineralocorticoid and Transdominant Glucocorticoid Receptor Blocks the Impairing Effects of Glucocorticoids on Memory** *HIPPOCAMPUS*
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2008; 18 (11): 1103-1111
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- **Characterization of monocyte chemoattractant protein-1 expression following a kainate model of status epilepticus** *BRAIN RESEARCH*
Manley, N. C., Bertrand, A. A., Kinney, K. S., Hing, T. C., Sapolsky, R. M.
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- **Viral caspase inhibitor p35, but not crmA, is neuroprotective in the ischemic penumbra following experimental stroke** *NEUROSCIENCE*
Sung, J. H., Zhao, H., Roy, M., Sapolsky, R. M., Steinberg, G. K.
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- **Structural consequences of Kcna1 gene deletion and transfer in the mouse hippocampus** *EPILEPSIA*
Wenzel, H. J., Vacher, H., Clark, E., Trimmer, J. S., Lee, A. L., Sapolsky, R. M., Tempel, B. L., Schwartzkroin, P. A.
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- **NAP protects hippocampal neurons against multiple toxins** *PEPTIDES*
Zemlyak, I., Manley, N., Sapolsky, R., Gozes, I.
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- **Conditions of protection by hypothermia and effects on apoptotic pathways in a rat model of permanent middle cerebral artery occlusion** *JOURNAL OF NEUROSURGERY*
Zhao, H., Wang, J. Q., Shimohata, T., Sun, G., Yenari, M. A., Sapolsky, R. M., Steinberg, G. K.
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- **The effects of toxoplasma infection on rodent behavior are dependent on dose of the stimulus** *NEUROSCIENCE*
Vyas, A., Kim, S., Sapolsky, R. M.
2007; 148 (2): 342-348
- **Mineralocorticoid receptor overexpression differentially modulates specific phases of spatial and nonspatial memory** *JOURNAL OF NEUROSCIENCE*
Ferguson, D., Sapolsky, R.
2007; 27 (30): 8046-8052
- **Biological stress response terminology: Integrating the concepts of adaptive response and preconditioning stress within a hormetic dose-response framework** *TOXICOLOGY AND APPLIED PHARMACOLOGY*
Calabrese, E. J., Bachmann, K. A., Bailer, A. J., Bolger, P. M., Borak, J., Cai, L., Cedergreen, N., Cherian, M. G., Chiueh, C. C., Clarkson, T. W., Cook, R. R., Diamond, D. M., Doolittle, et al
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- **Behavioral changes induced by Toxoplasma infection of rodents are highly specific to aversion of cat odors** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Vyas, A., Kim, S., Giacomini, N., Boothroyd, J. C., Sapolsky, R. M.
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- **An inflammatory review of glucocorticoid actions in the CNS** *BRAIN BEHAVIOR AND IMMUNITY*
Sorrells, S. F., Sapolsky, R. M.
2007; 21 (3): 259-272
- **Overexpression of a chimeric steroid receptor protects striatal neurons from cerebral ischemia** *32nd International Stroke Conference*
Cheng, M. Y., Sun, G., Zhao, H., Steinberg, G. K., Sapolsky, R. M.
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- **Phosphoinositide-3-kinase/Akt survival signal pathways are implicated in neuronal survival after stroke** *MOLECULAR NEUROBIOLOGY*
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2006; 26 (45): 11637-11643
- **Interrupting reperfusion as a stroke therapy: ischemic postconditioning reduces infarct size after focal ischemia in rats** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
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2006; 26 (9): 1114-1121
- **Culture in animals: The case of a non-human primate culture of low aggression and high affiliation** *SOCIAL FORCES*
Sapolsky, R. M.
2006; 85 (1): 217-233
- **Social cultures among nonhuman primates** *CURRENT ANTHROPOLOGY*
Sapolsky, R. M.
2006; 47 (4): 641-656
- **Gene therapy in the nervous system with superoxide dismutase** *BRAIN RESEARCH*
Zemlyak, I., Nimon, V., Brooke, S., Moore, T., McLaughlin, J., Sapolsky, R.
2006; 1088: 12-18

- **Sleep restriction suppresses neurogenesis induced by hippocampus-dependent learning** *JOURNAL OF NEUROPHYSIOLOGY*
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- **Marked differences in the efficacy of post-insult gene therapy with catalase versus glutathione peroxidase** *BRAIN RESEARCH*
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- **Akt contributes to neuroprotection by hypothermia against cerebral ischemia in rats** *JOURNAL OF NEUROSCIENCE*
Zhao, H., Shimohata, T., Wang, J. Q., Sun, G. H., Schaal, D. W., Sapolsky, R. M., Steinberg, G. K.
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- **Biphasic cytochrome c release after transient global ischemia and its inhibition by hypothermia** *JOURNAL OF CEREBRAL BLOOD FLOW AND METABOLISM*
Zhao, H., Yenari, M. A., Cheng, D., Sapolsky, R. M., Steinberg, G. K.
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- **The influence of social hierarchy on primate health** *SCIENCE*
Sapolsky, R. M.
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- **Environmental enrichment reduces A beta levels and amyloid deposition in transgenic mice** *CELL*
Lazarov, O., Robinson, J., Tang, Y. P., Hairston, I. S., Korade-Mirmics, Z., Lee, V. M., Hersh, L. B., Sapolsky, R. M., Mirmics, K., Sisodia, S. S.
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- **Hypothermia attenuates the decrease in phosphorylation of proteins in AKT cell signal pathway after permanent middle cerebral artery occlusion in rats** *30th International Stroke Conference*
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