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2008 : October 2008 - Fast Breaking Papers : Jean-Antoine Girault

FAST BREAKING PAPERS - 2008

October 2008



Jean-Antoine Girault talks with ScienceWatch.com and answers a few questions about this month's Fast Breaking Paper in the field of Pharmacology & Toxicology.



Article Title: ERK2: a logical AND gate critical for drug-induced plasticity?

Authors: Girault, JA;Valjent, E;Caboche, J;Herve, D

Journal: CURR OPIN PHARMACOL

Volume: 7

Issue: 1

Page: 77-85

Year: FEB 2007

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(addresses have been truncated)

SW: Why do you think your paper is highly cited?

It is a review which synthesizes current knowledge and proposes a new hypothesis. It may provide a useful framework for understanding the physiological significance of signaling pathways in striatal neurons, in relation to the actions of drugs of abuse.

SW: Would you summarize the significance of your paper in layman's terms?

Animals adapt their behavior to a changing environment thanks to powerful learning mechanisms, including reinforcement, in response to rewards. Dopamine, a chemical released in specific brain areas by a particular group of neurons, plays an important role in these learning mechanisms. In this article we review the mode of action of dopamine on target cells at a molecular level, focusing on an important enzyme named "extracellular signal-regulated kinase" or ERK.

Recent evidence shows that activation of ERK is important for long-term cellular alterations which underlie behavioral changes. We argue that ERK plays an important role by detecting the simultaneous activation of neurons that use glutamate as neurotransmitter and code information related to the environment in which the animal exists, and of dopamine neurons which signal a reward. We propose that this mechanism is hijacked by drugs of abuse which artificially increase dopamine levels.

"In this article we review the mode of action of dopamine on target cells at a molecular level..."

SW: How did you become involved in this research, and were there any problems along the way?

We have been interested in the action of dopamine for many years since it is a central neuromodulator in the brain, which is involved in a variety of pathological conditions in humans.

SW: Where do you see your research leading in the future?

We shall continue the dissection of the basic mechanism involved in incentive learning and in its diversion by drugs of abuse as well as in other pathological circumstances, including Parkinson's disease.

SW: Do you foresee any social or political implications for your research?

Since drug abuse is a widespread health problem with important societal consequences, progress in understanding the brain mechanisms underlying this pathology will help to fight against it with a better efficacy and possibly discover new therapeutic strategies.

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Keywords: signaling pathways in striatal neurons, drugs of abuse, dopamine, a central neuromodulator in the brain, extracellular signal-regulated kinase, long-term cellular alterations which underlie behavioral changes, neurons that use glutamate as neurotransmitter, dopamine neurons which signal a reward.



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