

**BIOGRAPHICAL SKETCH**

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NAME: Antonello Bonci

eRA COMMONS USER NAME (credential, e.g., agency login): ANTONB

POSITION TITLE: Scientific Director

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Vollum Institute for Advanced Biomedical Research, Portland, OR, USA	Postdoctoral Fellowship	1994-1996	Biomedical Research
School of Neurology, University of Rome "Tor Vergata", Rome, Italy	Resident	1991-1995	Neurology
Catholic University of Sacred Heart, School of Medicine, Rome, Italy	M.D.	1985-1991	Medicine

**A. Personal Statement**

I joined the National Institutes of Health (NIH) in 2010 as Scientific Director of the National Institute on Drug Abuse (NIDA). I was professor in residence in the Department of Neurology at the University of California, San Francisco (UCSF) and held the Howard J. Weinberg Endowed Chair in Addiction Research; as well as Associate Director for Extramural Affairs at the Ernest Gallo Clinic and Research Center. My laboratory was the first to demonstrate that drugs of abuse such as cocaine produce long-lasting modifications on the strength of the connections between neurons. This form of cellular memory is called long-term potentiation (LTP.) This finding cast a new light on the phenomenon of drug addiction, which could now be seen as a process of maladaptive learning and memory at the cellular level. In turn, this information helped explain why drug taking can often become such a long-lasting phenomenon, with relapse occurring even several years after the last encounter with a drug. Subsequently, my work has used a combination of electrophysiology, optogenetic, molecular and behavioral procedures to keep on studying the basic cellular mechanisms and circuits underlying reward and substance use disorders. Finally, we are currently in the process of developing an optogenetic-based treatment against cocaine use disorders, by using transcranial magnetic stimulation.

**B. Positions and Honors**Positions and Employment

1996-1998	Medical Executive, first level, IRCCS Hospital S. Lucia, Department of Neurorehabilitation and Dept. of Pharmacology, Rome, Italy
1998-1999	Visiting Assistant Professor, Dept. of Psychiatry, UCSF Sponsor: Prof. Robert C. Malenka
1999-1999	Visiting Assistant Professor, Dept. of Neurology, UCSF Principal Investigator, Ernest Gallo Clinic and Research Center
1999-2004	Assistant Professor in Residence, Dept. of Neurology, UCSF Principal Investigator, Ernest Gallo Clinic and Research Center
2004-2007	Associate Professor in Residence, Dept. of Neurology, UCSF Principal Investigator, Ernest Gallo Clinic and Research Center
2006-2010	Howard J. Weinberger Endowed Chair in Addiction Research at UCSF
2007-2010	Professor in Residence, Dept. of Neurology, UCSF
2011-Present	Adjunct Professor, Department of Neuroscience, Johns Hopkins University School of Medicine

2012-Present	Adjunct Professor of Psychiatry, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine
2016-Present	Adjunct Professor of Psychiatry, Department of Psychiatry University of Maryland, School of Medicine
2017-Present	Adjunct Professor, Department of Neuroscience, Georgetown University Medical Center, School of Medicine

#### Honors

2017	Distinguished Scientist Award, University of North Carolina-Chapel Hill
2017	Member, Dana Alliance for Brain Initiatives (DABI)
2016	Member, National Academy of Medicine
2015	Federation of European Neuroscience Societies (FENS) EJNI Award
2015	Member, Council, American College of Neuropsychopharmacology
2015	Fellow, American College of Neuropsychopharmacology
2009	D. Efron Award, American College of Neuropsychopharmacology
2004	Jacob P. Waletzky Memorial Award, Society for Neuroscience

### **C. Contribution to Science**

Over the last 15 years, the main goal of my laboratory has been to elucidate the role of long-term plasticity at excitatory synapses in the limbic system in modulating the development and expression of cocaine, stress and alcohol-dependent behaviors, in order to produce novel therapeutic strategies that could reverse these long-term synaptic changes, and as a consequence, drug-dependent behaviors. We have published a series of studies focused on this topic. These studies pioneered the field of drug-dependent synaptic plasticity, and have strongly influenced the research of all laboratories interested in substance use disorders and plasticity. In fact, drug-dependent synaptic plasticity is thought to be a key cellular phenomenon underlying substance use-dependent behaviors. The key studies on this topic produced by my laboratory are listed below:

1. Ungless MA, Whistler JL, Malenka RC, Bonci A. Single Cocaine Exposure in Vivo Induces Long-Term Potentiation in Dopamine Neurons. *Nature*. 2001 May 31;411(6837):583-7. PubMed PMID: 11385572.
2. Chen BT, Bowers MS, Martin M, Hopf FW, Guillory AM, Carelli RM, Chou JK, Bonci A. Cocaine but Not Natural Reward Self-Administration nor Passive Cocaine Infusion Produces Persistent LTP in the VTA Neuron. 2008 Jul 31;59(2):288-97. PubMed PMID: 18667156.
3. Stuber GD, Klanker M, de Ridder B, Bowers MS, Joosten RN, Feenstra MG, Bonci A. Reward-Predictive Cues Enhance Excitatory Synaptic Strength onto Midbrain Dopamine Neurons. *Science*. 2008 Sep 19;321(5896):1690-2. PubMed PMID: 18802002.
4. Kourrich S, Hayashi T, Tsai SY, Harvey B, Su TP, Bonci A. Dynamic Interaction between Sigma-1 Receptor and Kv1.2 Shapes Neuronal and Behavioral Responses to Cocaine. *Cell*. 2013 Jan 17;152(1-2):236-47. PubMed PMID: 23332758.
5. Edwards NJ, Tejada HA, Pignatelli M, Zhang S, McDevitt RA, Wu J, Bass CE, Bettler B, Morales M, Bonci A. Circuit specificity in the inhibitory architecture of the VTA regulates cocaine-induced behavior. *Nat Neurosci*. 2017 Jan 23. doi: 10.1038/nn.4482. [Epub ahead of print] PubMed PMID: 28114294.
6. Pignatelli M, Umanah G, Riberio SP, Chen R, Yau HJ, Dawson VL, Dawson TM, Bonci A. Synaptic Plasticity onto Dopamine Neurons Shapes Fear Learning. *Neuron*. 2017 Jan 18;93(2):425-440. PubMed PMID: 28103482.

A second line of research of my laboratory has focused on determining the pathways that are causally responsible for modulating reward- and cocaine-dependent behaviors. While it is extremely important to understand and elucidate the cellular basis for reward and cocaine-dependent plasticity, it is equally important to determine the contribution of limbic pathways in shaping these behaviors. Furthermore, through the development of optogenetics by Deisseroth, Zhang and Boyden a few years ago, and the diffusion of rTMS, the data collected from my laboratory had offered us unprecedented opportunities to design clinical trials aimed

at restoring physiological activity from brain regions that are severely affected by cocaine exposure. The very first of these clinical trials, based on our optogenetic work (Chen et al., 2013), is under submission, with very promising results.

Here is the list of studies that pertain to this area of research:

1. Stuber GD, Sparta DR, Stamatakis AM, van Leeuwen WA, Hardjoprajitno JE, Cho S, Tye KM, Kempadoo KA, Zhang F, Deisseroth K, Bonci A. Excitatory Transmission from the Amygdala to Nucleus Accumbens Facilitates Reward Seeking. *Nature*. 2011 Jun 29;475(7356):377-80. PubMed PMID: 21716290.
2. Britt JP, Benaliouad F, McDevitt RA, Stuber GD, Wise RA, Bonci A. Synaptic and Behavioral Profile of Multiple Glutamatergic Inputs to the Nucleus Accumbens. *Neuron*. 2012 Nov 21;76(4):790-803. PubMed PMID: 23177963.
3. Chen BT, Yau H, Hatch C, Chou SL, Hopf FW, Bonci A. Rescuing Cocaine-induced Prefrontal Cortex Hypoactivity Prevents Compulsive Cocaine Seeking. *Nature*. 2013 Apr 18;496(7445):359-62. PubMed PMID: 23552889.
4. McDevitt RA, Tiran-Cappello A, Shen H, Balderas I, Britt JP, Chung SL, Richie CT, Harvey B, Bonci A. Serotonergic versus non-serotonergic dorsal raphe projection neurons: differential participation in reward circuitry. *Cell Rep*. 2014 Sep 25;8(6):1857-69. PubMed PMID: 25242321.
5. Tejada HA, Wu J, Kornspun A, Pignatelli M, Kashtelyan V, Krashes MJ, Lowell BB, Carlezon WA, Bonci A. Pathway- and Cell-Specific Kappa-Opioid Receptor Modulation of Excitation-Inhibition Balance Differentially Gates D1 and D2 Accumbens Neuron Activity. *Neuron*. 2017 Jan 4;93(1):147-163. PubMed PMID: 28056342.

**Complete List of Published Work in MyBibliography:**

<http://www.ncbi.nlm.nih.gov/sites/myncbi/antonello.bonci.1/bibliography/48029589/public/?sort=date&direction=ascending>

**D. Additional Information: Research Support and/or Scholastic Performance (recused from all active grants, effective August 2010)**