



Review

Endogenous opiates and behavior: 2013



Richard J. Bodnar*

Department of Psychology and Neuropsychology Doctoral Sub-Program, Queens College, City University of New York, Flushing, NY 11367, United States

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ABSTRACT

This paper is the thirty-sixth consecutive installment of the annual review of research concerning the endogenous opioid system. It summarizes papers published during 2013 that studied the behavioral effects of molecular, pharmacological and genetic manipulation of opioid peptides, opioid receptors, opioid agonists and opioid antagonists. The particular topics that continue to be covered include the molecular-biochemical effects and neurochemical localization studies of endogenous opioids and their receptors related to behavior, and the roles of these opioid peptides and receptors in pain and analgesia; stress and social status; tolerance and dependence; learning and memory; eating and drinking; alcohol and drugs of abuse; sexual activity and hormones, pregnancy, development and endocrinology; mental illness and mood; seizures and neurologic disorders; electrical-related activity and neurophysiology; general activity and locomotion; gastrointestinal, renal and hepatic functions; cardiovascular responses; respiration and thermoregulation; and immunological responses.

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Abbreviations: Ach, acetylcholine; AchE, acetylcholine esterase; ACTH, adrenocorticotrophic hormone; ADHD, attention deficit/hyperactivity disorder; AIDS, autoimmune deficiency syndrome; AMSH, alpha-melanocyte-stimulating hormone; BAM, bovine adrenal medulla peptide; BDNF, brain-derived neurotrophic factor; BEND, beta-endorphin; BFNA, beta-funaltrexamine; BNST, bed nucleus of the stria terminalis; Ca(2+), calcium; cAMP, cyclic adenosine monophosphate; CART, cocaine and amphetamine-regulated transcript; CB, cannabinoid; CCK, cholecystokinin; CFA, complete Freund's adjuvant; CGRP, calcitonin gene-related peptide; CNS, central nervous system; CO, carbon monoxide; COMT, catechol-O-methyltransferase; COX, cyclooxygenase; C/P, caudate/putamen; CPP, conditioned place preferences; CREB, Ca(2+)/cAMP responsive element binding protein; CRF, corticotropin factor; CSF, cerebrospinal fluid; CTOP, D-Phe-Cys-Tyr-D-Trp-Orn-Thr-Pen-Thr-NH₂; DA, dopamine; DADL, D-Ala(2), D-Leu(5)-enkephalin; DALDA, D-Arg-Phe-Lys-NH₂; DAMGO, D-Ala(2), Nme(4), Gly-ol(5)-enkephalin; Delt, deltorphin; DHEA, dehydroepiandrosterone; DNIC, diffuse noxious inhibitory control; DOR, delta opioid receptor gene; DPDPE, D-Pen(2), D-Pen(5)-enkephalin; DREAM, downstream regulatory element antagonistic modulator; DRG, dorsal root ganglion; DRN, dorsal raphe nucleus; DYN, Dynorphin; EEG, electroencephalographic; Enk, enkephalin; EPSC, excitatory post-synaptic currents; ERK, extracellular regulated signal kinases; FMRI, functional magnetic resonance imaging; FSH, follicle-stimulating hormone; GABA, gamma-aminobutyric acid; GI, gastrointestinal; GnRH, gonadotropin-releasing hormone; HIV, human immunodeficiency virus; HPA, hypothalamic-pituitary-adrenal; HPLC, high performance liquid chromatography; HR, heart rate; IBD, irritable bowel disease; ICSS, intracranial self-stimulation; ICU, intensive care unit; IL-8, interleukin-8; IPSC, inhibitory post-synaptic currents; JNK, c-Jun N-terminal kinase; K(+), potassium; KO, knockout; KOR, kappa opioid receptor gene; LC, locus coeruleus; Lenk, leu-enkephalin; LH, leutinizing hormone; L-NAME, N(omega)-nito-L-arginine methyl ester; LPS, lipopolysaccharide; LTP, long-term potentiation; MAM, monoacetylmorphine; M3G, morphine-3-glucuronide; M6G, morphine-6-glucuronide; MAO, monoamine oxidase; MAP, mean arterial pressure; MAPK, mitogen-activated protein kinase; Menk, met-enkephalin; MOR, mu opioid receptor gene; mPFC, medial prefrontal cortex; MPOA, medial preoptic area; MRI, magnetic resonance imaging; mRNA, messenger ribonucleic acid; NAC, nucleus accumbens; NBNI, nor-binaltorphamine; NE, norepinephrine; NGF, nerve growth factor; NMDA, N-methyl-D-aspartate; NO, nitric oxide; NOS, nitric oxide synthase; NPY, neuropeptide Y; NRM, nucleus raphe magnus; NSAID, non-steroidal anti-inflammatory drug; NTL, naltrindole; NTS, nucleus tractus solitarius; OFQ/N, nociceptin; ORL-1, orphan receptor like receptor; 6-OHDA, 6-hydroxydopamine; PAG, periaqueductal gray; PBN, parabrachial nucleus; PCA, patient-controlled analgesia; PCPA, para-chlorophenylalanine; PDYN, prepro-dynorphin; PENK, prepro-enkephalin; PET, positron emission tomography; PKA, protein kinase A; PKC, protein kinase C; POFQ/N, pro-orphanin FQ/nociception; POMC, pro-opiomelanocortin; PTSD, post-traumatic stress disorder; PVN, paraventricular nucleus; RVM, rostral ventromedial medulla; 5-HT, serotonin; SN, substantia nigra; SP, substance P; SSRI, selective serotonin reuptake inhibitor; STZ, streptozotocin; TENS, transcutaneous nerve stimulation; THC, tetrahydrocannabinol; TMJ, temporomandibular joint; TNF, tumor necrosis factor; TP, testosterone; TRP, transient receptor potential; TTX, tetrodotoxin; VTA, ventral tegmental area; WDR, wide-dynamic range.

* Correspondence to: Department of Psychology, Queens College, CUNY, 65-30 Kissena Boulevard, Flushing, NY 11367, United States. Tel.: +1 718 997 3543; fax: +1 718 997 3257.

E-mail address: richard.bodnar@qc.cuny.edu

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