Survey of publications

Summary of publications from 1/1/2015 - 12/31/2016 known to have used NEURON, discovered by 20170224.

Total number 195.

2015 127

2016 = 68

Membrane capacitance

specific membrane capacitance of neocortical pyramidal cells (Eyal et al. 2016)

effects of frequency-dependent membrane capacitance on excitability (Howell et al. 2015a)

Ion channels and channel subunits (also see Epilepsy/channelopathies)

kinetics and temperature dependence of Na and K channel gating (Fohlmeister 2015)

spontaneous ectopic spiking in unmyelinated axons produced by stochastic gating (O'Donnell and van Rossum 2015)

distribution of ion channels

distribution of Ih channels in hippocampal oriens-lacunosum/moleculare interneurons (Sekulić et al. 2015)

diversity of A currents in neurons of the nucleus tractus solitarii (Strube et al. 2015)

Functional consequences of intrinsic neuronal properties

roles of ionic currents in governing neuronal dynamics (Alturki et al. 2016)

sodium channels

contribution of Nav1.1, Nav1.6 and Navβ4 to high frequency spiking (Patel et al. 2015)

role of NaV 1.6 in spike initiation and firing pattern (Feng et al. 2015)

Kv7

effects on excitability of thalamocortical relay neurons (Cerina et al. 2015) and spinal motoneurons (Lombardo and Harrington 2016)

effects on excitability, resonance, and temporal summation in hippocampal Ca1 neurons (Hönigsperger et al. 2015)

role of Ih in fusiform neurons of the dorsal cochlear nucleus (Ceballos et al. 2016)

role of TRPM8 channels in cold sensation (Olivares et al. 2015)

linearity vs. nonlinearity of "leak" currents (Huang et al. 2015)

interactions between TRPV4 and KCa mediate osmosensation in neurons of the paraventricular nucleus of the hypothalamus (Feetham et al. 2015)

propagation of subthreshold electrical signals in cells (Yang et al. 2016)

mechanisms of calcium wave propagation (Neymotin et al. 2015)

neuronal excitability and spike initiation

functional analysis of the Hodgkin-Huxley equations (Moore 2015)

covariation between location of axon initial segment and apical dendrite diameter in layer 5 pyramidal neurons (Hamada et al. 2016)

spike initiation: role of axonal compartmentalization in spiking of cerebellar Purkinje cells(Masoli et al. 2015)

a common mechanism for generation of low threshold Ca spikes (Connelly et al. 2015)

spike propagation

in myelinated and non-myelinated axons (Castelfranco and Hartline 2015)

consequences of axonal constriction at nodes of Ranvier (Johnson et al. 2015)

firing patterns

mechanisms of different firing patterns thalamic reticular nucleus neurons (Hernandez et al. 2015)

firing rate shifts the phase response curve of cerebellar Purkinje cells (Couto et al. 2015)

mechanism of bursting in midbrain dopamine neurons (Yu and Canavier 2015)

persistent spiking

contribution of intracelluluar and synaptic mechanisms to persistent spiking (Jochems and Yoshida 2015)

prolongation of spiking caused by reversal of Na/Ca exchange (Zylbertal et al. 2015)

active dendrites

gain control (Hay and Segev 2015)

coincidence detection (Das and Narayanan 2015), (Shai et al. 2015)

homeostasis

mechanisms of calcium homeostasis (Srikanth and Narayanan 2015)

activity-dependent remodeling of the axon initial segment in Ca1 pyramidal neurons (Wefelmeyer et al. 2015)

dendritic morphology

electrotonic structure of cerebellar granule cells (Delvendahl et al. 2015)

interspecies differences in anatomical and electrotonic architecture of cortical pyramidal cells (Mohan et al. 2015)

role in pattern recognition (de Sousa et al. 2015)

determinant of whether NMDA spikes are localized or generalized (Poleg-Polsky 2015)

Synaptic transmission

role of calmodulin in transmitter release and short term synaptic plasticity (Timofeeva and Volynski 2015)

functional roles of short term plasticity of mono- and polysynaptic inputs to a motoneuron pool (Jiang et al. 2015)

mechanisms of synaptic facilitation and depression

diversity of mechanisms responsible for sliding threshold STDP (Anirudhan and Narayanan 2015)

mechanisms of heterosynaptic long term potentiation (LTP) of perforant path inputs to CA3 pyramidal cells (Hyun et al. 2015)

LTP of distal synapses in hippocampal pyramidal neurons requires dendritic sodium spikes (Kim et al. 2015a)

mechanism of LTP and LTD in hippocampal dentate gyrus (Jedlicka et al. 2015)

induction of LTP vs. LTD depends on initial synaptic state (Migliore et al. 2015a)

effect of network bursts on STDP-induced LTP and LTD (Delattre et al. 2015)

inhibitory control of localized STDP (Saudargienė and Graham 2015)

mechanism of variation of synaptic plasticity throughout the theta cycle (Saudargiene et al. 2015)

functional consequences of spike timing dependent potentiation (STDP) of inhibitory synapses (Wilmes et al. 2016a)

effect of spine neck resistance on electrical coupling between spine head and dendritic shaft (Popovic et al. 2015)

local activation of Na channels in dendritic spines (Bywalez et al. 2015)

conductances of individual synaptic connections between cortical inhibitory neurons and pyramidal neurons (Hoffmann et al. 2015)

functional consequences of depolarizing GABAergic/glycinergic synaptic transmission (Branchereau et al. 2016)

AMPAergic modulation of the excitability of fast spiking interneurons of the hippocampal dentate gyrus (Dasgupta and Sikdar 2015)

Inhibition

spatial localization of inhibitory effects

depends on anatomical location of inhibitory synapses (Kubota et al. 2015)

and temporal localization of inhibitory effects (Müllner et al. 2015)

distribution of GABA-B receptor-mediated currents in Ca3 pyramidal cells (Degro et al. 2015)

effects on neuronal gain (Jang et al. 2015)

functional consequences of short-term facilitation and depression of inhibitory inputs (Lavian and Korngreen 2016)

inhibiting backpropagating spikes can prevent associative plasticity (Wilmes et al. 2016b)

effects of axonal inhibition (de San Martin et al. 2015)

functional roles of feedforward inhibition by different interneuron classes (Ferrante and Ascoli 2015)

Gap junctions

functional consequences of gap junctions

between unmyelinated axons of rhythmically active neurons (Hull et al. 2015)

between interneurons (Amsalem et al. 2016)

properties and functional consequences in cerebellum (Szoboszlay et al. 2016)

Ephaptic interactions

localized ephaptic coupling promotes network synchrony (Stacey et al. 2015)

Synaptic integration

spatially structured synaptic inhibition (Bloss et al. 2016)

EPSP amplification in thalamocortical neurons (Connelly et al. 2016)

contributions of cellular anatomy and biophysical properties to synaptic integration (Kim and Heckman 2015)

integration of excitation and feedforward inhibition in olfactory bulb granule cells (Burton and Urban 2015)

Neural-glial interactions

(Ashhad and Narayanan 2016)

Noise and stochastic phenomena

stochastic resonance (McDonnell et al. 2015)

role of synaptic noise in selective attention (Béhuret et al. 2015)

Learning and memory

cholinergic modulation of calcium activated non-specific cationic (CAN) current switches operation of hippocampal place cells between encoding and consolidation/replay (Saravanan et al. 2015)

Network phenomena

rules for formation of specific network connections (Qi and Feldmeyer 2015)

generation of an inhibitory surround (Krishnamurthy et al. 2015)

effects of GABA-A dynamics on cortical activity (Chemla and Chavane 2016)

network mechanisms of persistent neuronal activity (Neymotin et al. 2016a)

generation of oscillations

role of Ih (Avella Gonzalez et al. 2015)

by interactions of two pools of excitatory neurons (Hull et al. 2016)

oscillations produced in hippocampal dentate gyrus granule cells by interaction of afferent inputs and local inhibition (Hendrickson et al. 2015)

origins of theta (Ferguson et al. 2015) and gamma (Balakrishnan and Pearce 2015) oscillations in Ca1 region of hippocampus

origins of high frequency oscillations in hippocampus (Fink et al. 2015)

role of postinhibitory rebound and type 2 excitability in generation of robust gamma oscillations (Tikidji-Hamburyan et al. 2015)

mechanisms and effects of variability of oscillations (Fietkiewicz et al. 2016)

mechanism of temporal sequence discrimination (Koutsou et al. 2015)

consequences of inhibitory projections from substantia nigra pars reticulata (SNr) to the thalamus (Kase et al. 2015)

time- and rate-coding by cerebellar nuclei neurons (Sudhakar et al. 2015)

Cellular and network properties and phenomena in sensory processing

olfactory bulb

lateral inhibition (McIntyre and Cleland 2016)

cholinergic and adrenergic modulation of olfactory bulb granule cell activity (Li et al. 2015)

odorant activation of clusters of synapses in individual glomeruli (Migliore et al. 2015b)

"layered processing" of olfactory signals in the olfactory bulb (Cavarretta et al. 2016)

activity-dependent remodeling of inhibitory neurons (Breton-Provencher et al. 2016)

cellular mechanisms of slow oscillations in the accessory olfactory system (Gorin et al. 2016)

retina

integration of signals by wide-field amacrine cells (Manookin et al. 2015)

interaction of amplification by NMDAR currents and directionally tuned inhibition (Poleg-Polsky and Diamond 2016a)

balanced excitation and inhibition (Poleg-Polsky and Diamond 2016b)

dendritic computation of motion direction (Vlasits et al. 2016)

dorsal lateral geniculate nucleus

role of triadic synapses in processing of visual stimuli (Heiberg et al. 2016)

circuit origin of motion anticipation (Johnston and Lagnado 2015)

auditory system

cochlear nucleus

inhibition shapes input-output relationship of spherical bushy cells (Kuenzel et al. 2015)

spiking of a small number of granule cells may inhibit many other granule cells (Yaeger and Trussell 2015)

barrel cortex

integration of distal inhibitory and proximal excitatory inputs by layer 2 pyramidal neurons (Egger et al. 2015)

functional consequences of lateral excitatory connections between layer 2/3 pyramidal cells (Sarid et al. 2015)

spatial localization

integration of spatial and nonspatial information in granule cells of the dentate gyrus (Hayakawa et al. 2015)

Sensorimotor integration

network mechanisms in C. elegans (Portegys 2015)

role of short-term synaptic plasticity in temporal sequence discrimination (Goudar and Buonomano 2015)

Extracellular recording and stimulation

generation of local field potentials (Parasuram et al. 2016)

effects of tissue properties on extracellular recordings (Gomes et al. 2016)

effects of anisotropy on subdural cortical stimulation (Seo et al. 2015)

effects of subthreshold extracellular fields on neurons (Migliore et al. 2016)

extracellular stimulation

of dendrites and axons (Stern et al. 2015a), peripheral nerve (Reilly 2016), vestibular nerve (Marianelli et al. 2015)

electrode design for retiinal stimulation (Cao et al. 2015)

magnetic stimulation of peripheral nerve (Kagan et al. 2016), (RamRakhyani et al. 2015)

effect of mangetic stimulation on synaptic transmission (Lenz et al. 2015)

deep brain stimulation (DBS) methodology

effects of stimulus temporal pattern on therapeutic efficacy (Swan et al. 2016), (Couto and Grill 2016)

effects of tissue inhomogeneity (Howell and McIntyre 2017)

evaluation of axonal activation (Hartmann et al. 2015)

use of evoked compound action potential as a guide to adjusting stimulus intensity (Kent et al. 2015)

subject-specific modeling of DBS (Zitella et al. 2015)

designing electrodes to improve selectivity and efficiency (Howell et al. 2015b)

combining electrode design and optimization of stimulation parameters to achieve selective DBS of the subthalamic nucleus (van Dijk et al. 2015)

DBS of central thalamus for impaired arousal and cognition following severe brain injury (Baker et al. 2016)

Epilepsy

channelopathies

encephalopathy caused by mutations of voltage sensor (Miceli et al. 2015) in Kv7.2 and 7.3 subunits

roles of specific ionic currents

positive shifts of reversal potential of GABAergic currents (Alfonsa et al. 2015)

contribution of action potentials to high frequency oscillations in the EEG (Kobayashi et al. 2015)

effects on neuronal properties

homeostatic adjustment of dentate granule cell excitability preserves interictal function of dentate gyrus (Yim et al. 2015)

network mechanisms

role of localized ephaptic coupling (Stacey et al. 2015)

role of impaired dendritic inhibition in temporal lobe epilepsy (Sanjay et al. 2015)

therapy

potential utility of GABA-A receptor agonists for mesial temporal lobe epilepsy (Stamboulian-Platel et al. 2016)

Development and maintenance of cells and circuits

trophic and other factors

effects of BDNF on morphology and excitability (Galati et al. 2016)

effects of FNF on axonal excitability and repetitive spiking (Dover et al. 2016)

Other clinical issues

brain energy budget (Ju et al. 2016)

mechanisms of ischemic injury (Hübel et al. 2016)

demyelination-induced alterations of axonal excitability in layer 5 pyramidal neurons (Hamada and Kole 2015)

chronic pain

roles of morphology and local channel expression near the bifurcation (T-junction) of C fibers (Sundt et al. 2015)

multifocal hyperexcitability and ectopic afterdischarge in peripheral nerve (Coggan et al. 2015)

role of slow and persistent sodium channels in induction of nociceptor hyperexcitability by tumor necrosis factor (Gudes et al. 2015)

evaluation of gate control theory in prediction of response to spinal cord stimulation (Zhang et al. 2015)

opiate-withdrawal-induced alterations of anatomy and physiology of ventral tegmental area neurons (Enrico et al. 2016)

altered potassium channel expression in Down syndrome (Stern et al. 2015b)

anatomical and biophysical responses to loss of afferent inputs (Kuba et al. 2015)

neuroprotective effects of glial swelling in mild trauma (Volman and Ng 2016)

functional consequences of injury-induced dendritic remodeling (Platschek et al. 2016)

effects of low dose proton irradiation on biophysical properties of neurons (Sokolova et al. 2015)

effects of aging on neuronal properties

effects of aging on morphology and electrophysiology of layer 3 pyramidal cells in primary visual cortex (Luebke et al. 2015) and prefrontal cortex (Coskren et al. 2015)

functional effects of age-related changes of neuronal morphology

Alzheimer's disease

compensatory changes of membrane properties that accompany dendritic atrophy (Somogyi et al. 2016)

conditioned fear (Kim et al. 2016)

effects of schizophrenia-related mutations of ion channel and calcium transporter genes on neuronal excitability (Mäki-Marttunen et al. 2016)

role of hypothalamic neurons in regulation of body weight (Branco et al. 2016)

cortical cellular and circuit mechanisms involved in dystonia (Neymotin et al. 2016b)

role of Cav3.2 channels in amyotrophic lateral sclerosis (Rzhepetskyy et al. 2016)

Kv1.1 channelopathy and pathogenesis of episodic ataxia type 1 (Begum et al. 2016)

SK channel activators as a possible target for treatment of cerebellar ataxia (Abbasi et al. 2016)

prosthetics development (Dura-Bernal et al. 2015) (Dura-Bernal et al. 2016)

epidural spinal stimulation for treatment of gait defects after spinal cord injury (Moraud et al. 2016)

Non-neural cells and tissues

T cells (Ehling et al. 2016)

syncitia

model of urinary bladdor detrusor (Appukuttan et al. 2015)

electric stimulation of smooth muscle cells of the urinary bladder detrusor (Kochenov et al. 2015a) (Kochenov et al. 2015b)

peripheral vasculature

effects of temporal pattern of sympathetic activity on smooth muscle cell tone (Briant et al. 2015)

skeletal muscle

spike-driven model of muscle activation dynamics (Kim et al. 2015b)

cardiac muscle

Na channel palmitoylation regulates excitability (Pei et al. 2016)

Modeling strategies and tools designed to be used in conjuction with NEURON

PyRhO (Evans et al. 2016)

automation of model construction (Guet-McCreight et al. 2016)

optimization (Lupascu et al. 2016) (Van Geit et al. 2016) (Rumbell et al. 2016)

coupling with other simulators (Weidel et al. 2016)
simulation management software (Stockton and Santamaria 2015)
analysis and modeling of neocortical microcircuitry (Markram et al. 2015)

Development and evaluation of computational methods

simulating large scale networks (Cattani et al. 2016)
simulating individual neurons (Wybo et al. 2015)
simulating neurons subjected to mechanical loads (García-Grajales et al. 2015)
tuning generalized integrate-and-fire cell models to experimental observations from real neurons (Pozzorini et al. 2015)
Volterra representation of complex, nonlinear synaptic dynamics (Hu et al. 2015)
generation of synthetic data for evaluation of spike sorting algorithms (Hagen et al. 2015)

Design and evaluation of experimental methodologies

locating the spike initiation zone in cells with complex morphology (Günay et al. 2015)
effect of dendritic input location on MEG and EEG source dipoles (Ahlfors and Wreh 2015)
effects of genetic manipulations
    knockout mutations on neurons and networks (Williams et al. 2015)
microelectrode array recording of neural activity (Ness et al. 2015) (Głąbska et al. 2016)
effects of glial scarring and electrode interface phenomena in chronic microelectrode recording (Malaga et al. 2016)
magnetic sensing of spikes (Barry et al. 2016)
interpretation of fMRI signals (Uhlirova et al. 2016)
fast magnetic sensing (Xu et al. 2016)
spike sorting (Wu et al. 2015)
local field potential recording (Tomsett et al. 2015)
relationship between discharge hysteresis and contribution of dendritic persistent inward currents to motoneuron spiking (Powers and Heckman 2015)

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