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Titolo	Neural circuits underlying emotion and motivation : insights from optogenetics and pharmacogenetics / / edited by Anton Ilango and Mary Kay Lobo
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Sommario/riassunto	Application of optogenetic and pharmacogenetic tools to study the neural circuits underlying emotional valence, feeding, arousal and motivated behaviors has provided crucial insights into brain function. Expression of light sensitive proteins into specific neurons and subsequent stimulation by light (optogenetics) to control neuronal activity or expression of designer receptors exclusively activated by designer drugs (DREADD) in specific neuronal populations with subsequent activation or suppression of neuronal activity by an otherwise inert ligand (pharmacogenetics) provides control over defined elements of neural circuits. These novel tools have provided a more in depth understanding into several questions about brain function. These include:• Regulation of sleep-wake transition by the interaction of hypocretin neurons of lateral hypothalamus and nor adrenergic neurons of the locus coruleaus• Regulation of feeding by AGRP and POMC neurons in arcuate nucleus of the hypothalamus• Place preference and positive reinforcement by activation of DA neuron of VTA• Place aversion by activation of VTA GABA and lateral habenula neurons• Opposing influences on reinforcement by activation of D1 and D2 expressing medium spiny neurons of dorsal striatum and

nucleus accumbensThe list still grows...From cell type specific manipulations to signaling properties in the cell (Dietz et al 2012) with unprecedented temporal resolution, these tools revolutionize the exploration of pathways/connectivity. Recent years also witnessed the extension of applying these tools from studying emotional valence and motivated behavior to reactivation of memory. c-fos based genetic approaches allowed us to integrate light sensitive opsins or DREADD receptor into specific neurons that are activated by certain learning events (for example fear) (Garner et al 2012; Liu et al 2012).In this Research Topic, we welcome researchers to contribute original research articles, review articles, methods and commentary on topics utilizing optogenetic and pharmacogenetic tools to study the neural circuits underlying emotional valence, motivation, reinforcement and memory. We believe the Research Topic will shine light on various questions we have about brain function by using novel optogenetic and pharmacogenetic tools and will hopefully inspire ongoing research to overcome the hurdles of using these tools to advance clinical applications.