# Relationship between Drug Addiction, Habit and Auto-Immunodeficiency Syndrome

#### Saganuwan Alhaji Saganuwan<sup>\*</sup>

Department of Veterinary Pharmacology and Toxicology, College of Veterinary Medicine Benue State, Nigeria

\***Corresponding author:** Saganuwan Alhaji Saganuwan, Department of Veterinary Pharmacology and Toxicology, College of Veterinary Medicine, Federal University of Agriculture, P.M.B. 2373, Makurdi, Benue State, Nigeria, Tel: +2347039309400; E-mail: pharn\_saga2006@yahoo.com

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### Abstract

Habit, a process of doing thing, formed in the brain and affected by a number of factors including drug. However, habit changes may continue throughout life pending on the goals and prevailing conditions. Hence there is need to determine neuropsychosocial relationship between habit, drug addiction and autoimmuno deficiency syndrome. Literatures were searched on the relationship between habit, drug addiction, and brain and autoimmunodeficiency syndrome with a view to identifying other possible factors responsible for social vices across the globe. Findings have shown that drugs such as adrenaline, adrenergic agonists, dopamine, serotonin and serotonin agonists, and dopaminergic agonists, among others could be responsible for psychopathy. The consequences include but not limited to conservatism, racial discrimination, religious fanaticism, war mongering, ethnic jingoism, maladministration, total collapse of values among others. Hence, drug addiction and autoimmune deficiency syndrome may cause neuropsychosocial disorder that has to do with neuronal modulation or damage affecting nigrostriadal pathway.

Keywords: Behavior, drug, neurodegenerative disorder, addiction

#### Introduction

There is a lot of social vices occasioned by Arab spring, Boko Haram in Nigeria, Nigerian Fulanis herdsmen – farmers clashes, Aum Shirinkyo in Japan, demonstration following announcement of the present American president, threat from North Korean president, British exit from European Union, Catarlan and Scottish secessionists, ISIS/Talaban war, South Sudan ethnic war, religious and racial sentiments shown by some leaders and public figures and general increase of moral decadence among youths. Threatening, Reactionary, Unforgiving, Machiavellian and Partisan mind brain set has been theorized (Gonclaves and Boggio, 2017), to be responsible for political crises with attendant consequences on global current and future events (Coutinho et al., 2013) in relation to world politics (Jost et al., 2014). Habit is the way, manner, process of doing things in consistent form. Hence attitude can translate to habit and habit can translate to character. Character is the combination of factors that makes a person's nature or personality (Robinson and Davidson, 2007). Habitual behaviour is a function of corticosteroidal loops that comprise sensorimotor, (BA 1-3) associative and limbic pathways (BA 23, 24, 31, 34, 35, 37, 38), whereas striatum comprises caudate (dorsomedial striatum), putamen (dorsolateral striatum) and mucleus accumbens (ventral striatum). But dopaminergic midbrain comprises substatantia nigra and ventral tegmental area. These pathways are responsible for goal-directed/flexible behaviour to habitual behaviour as well as Parkinson's Disease (PD) and Huntington Disease (HD), respectively (Foerde, 2008). Senile dementia pathogenesis may so be along the pathway (BA 46, 47) (Strytzer, 2009). Habituation is the capability of brain to ignore irrelevant or extraneous information inundated sensority. Whereas the brain capacity to enhance or store certain memories traces through facilitation of synaptic circuits is called memory sensitization (Guyton and Hill, 2006). Human Immunodeficiency Virus / Immune Deficiency Syndrome (HIV/AIDS) affects about 37 million people worldwide (Bland, 1986). Despite antiretroviral therapy, HIV-positive individuals do experience neuro HIV disorders such as cognitive impairment, substance abuse and dependence. Therefore, HIV -I transgenic (HIV-I Tag) rat, a model of neuro HIV has proven that HIV-I proteins in the CNS increases the sensitivity and susceptibility of HIV-positive individuals to substance abuse (Cappelletti et al., 2017).

# Relationship between Drug and Habit Formation

During habit formation, thought, action and choice are less dependent on cognitive resources (knownuton and Diedrichson, 2008). Hence parts of brain in connection with habit when affected pathologically can lead to abnormal habit which ranges from breach of peace passing through hooliganism to war. Drugs that could affect this part of brain are alcohols, narcotics, hypnotics, stimulants and depressants. Area 32 (dorsal anterior cingulate) for emotional judgement, area 34 (dorsal endocrinal area) for memory and emotional assessment, area 35 (ferirhinal area) for happiness, sadness and disgust, area 38 (temporopolar area) for social and emotional processing, self-other distinction, memory retrieval and humour comprehension, area 46 (middle frontal area) for motivation attention and cognitive tasks and

area 47 (orbital area) for emotional, affection and memory (Strotzer, 2009; Ozson et al., 2007) are responsible for recognition and acceptance of activities that can be turned to habits.Attitudes translate to habits which in turn translate to characters are functions of brain that is a key to mind and behaviour. The responsible parts which are area 7 (superior parietal area) involves episodic memory retrieval, area 9 (granular frontal area) for memory, cognitive task and personality, area 10 (frontopolar area) for central executive, area 11 (prefrontal area) for social behaviour, area 19 (preocipital area) for face recognition, area 20 (inferior temporal area) for emotional mind of colour and facial expression, area 23 (ventral posterior cingulate area) for face familiarity and emotional processes, area 24 (ventral anterior cingulate area) for emotional assessment of fair perception, area 27 (presubicular area) for memory eroding, area 28 (anticlinal area) for memory encoding and consolidation first affected on Alzheimer's disease, area 31 (dorsal posterior cingulate area) for episodic memory retrieval and recognition of familiar faces are responsible for habit formation and change. Dispositional resistance to change predicts responses to other changes (Oreg, 2000), which has potential benefits of performing routine tasks with detrimental effects on non-routine tasks (Oreg, 2018).

### Formation and Change of Habit

The role of striatum in the formation and change of habit cannot be over emphasized. The pathways are both direct and indirect with interneuron play that involves dopaminergic inputs, potential context and amygdala indicating that habits occur in graded strength, compete with strategies for translation to behaviour. Hence habit can be of different phenotypes expressed by signalling pathways in the brain (Amaya and Smith, 2018). Habit originates from dorsal striatum similar to putamen of primates (Knowlton and Patterson, 2016), which plays role in action-response phenomenon, punishment and contingency (Smith and Graybel, 2016). However, dorsomedial striatum caudate homologue is responsible for habitual measures that will lead to achievements of specific parts (Balleine and O'Doherty, 2010). The pathways involve dopamine and dopamine (D2) and adenosine (x2) receptors (Lovinfer, 2010). Neocortex (inflalimbic) and amygdala modulate basal ganglia for habits formation and changes (Amaya and Smith, 2018. Stronger habits could rise from strong and competing challenges (Gremel and Costa, 2013).

Formation and change of habit involve cognitive and attentional mechanisms, self-control, environmental pressures and intrapsychic forces (Cardeen and Wood, 2008). Cognitive process of habit formation, effortless self-control habit, changing habits, implementation, intentions, reminders, rewards are driven by persons and the environment (Rozin et al., 2011). Children should be helped to realize and give account of their specific goals (Hertsberg et al., 2015). During observation, neural structures are recruited for actual execution and observation which take place in the frontal lobe but not restricted to the ventral premotor cortex, although, it involves somatic pic motor circuits (Bucarso et al., 2001). Drugs, diet and stress promote habitual control to which is prevalent across neuropsychiatric disorders. Hence neural determinants of habitual control may change behaviour (Corbot, 2018). Striatum of the nasal sash is responsible for learning by receiving inputs from cortical returns. It comprises direct and indirect pathways from kinematics to habits. Not all highly trained behaviour sequences are habits (O'Hare et al., 2015). Motivational control of action is governed by cue-driven, outcome-insensitive habits and value based, goal directed behaviours. Habits are driven by putamen-thalamic motor regains and value-based decision making is a function of caudate network translating to restoring flexibility in rigid habits (Cecedi and Tricomi, 2018). Therefore, distinguishing cue and value driven action, discordance in contemporary methods, cortico-striatal connectivity, deficits in fail-directed control, compulsion-driven pathologies are very crucial to regulating actions control which are evident in neural abnormalities that impact on value-based decision making (Gillan et al., 2015).Our daily behaviour is based on habit learning and representations are functions of corticostriatal system via direct and indirect basal ganglia, some attentional mechanisms are habitual (Seger, 2018). Respiratory sinus arrhythmia (RSA) is a measure of parasympathetic influence on the heart rate that decreases when a person faces challenges. But skin conductance response (SCR) is a measure of sympathetic arousal that increases when a person meets challenges (Bahr, 2015), suggesting the roles of parasympathomimetic via vagal nerves which decreases diastole and sympathomimetic study increases both systole and diastoles indicating that meeting a challenge is more hectic and requires dissipation of energy than facing a challenge.

#### **Brain and Habit Formation**

Habit formation is computed by brain as evidenced by neurobiology which suggests that similar mechanisms for habitual learning and control apply across diverse psychological domains. For example, sensory system stimulates Hebbian and reinforcement learning leading to habit strength that selects action on environment which is interpreted by sensory systems (Pauli et al., 2018). Mastering a motor skill is a function of a decrease in variability that can reveal control priority (Sternad, 2018). Amblygonscarpus and ogensis was administered to rats that displayed stereotype activities from amphetamine. The stereotype activities about 1-2hr after administration of the theatrics sign find that amphetamine can change goal-directed habit which can be unified by the extract (Ebbo et al., 2010). Also, condensed nitrogen carbocycles can be converted to various heteroatoms that can change habits invariably changing the mind and brain leading to temporary or permanent madness (Saganuwan, 2011).

#### Habit and Excitatory Neurotransmitter

Spinal plasticity affects locomotion which is both neuronal and synaptic that support and maintain acquisition of motor skills. This is achieved by reconciliation between spinal cord function and spinal cords, long-recognized reliability (Norton and Wolpan, 2018). Skills' learning is dependent on memory retention of skill-use experiences overtime. The memory has to be consolidated and robust against unnecessary interference. Sleep consolidate skill learning by reducing the effects and

protection of interference and aiding abstraction and generalization of skill learning (Heald, 2008). Mother's opinion involving face to face contact is required to build a therapeutic relationship (Clarke et al., 2014). Social anxiety about the selfincreased physiological arousal impacts on speech fluency. Respiratory sinus arrhythmia (RSA) is a measure of parasympathetic influence on the heart that reduces during challenge condition whereas skin conductance response (SCR) is a measure of sympathetic arousal that increases during challenge (Buhr, 2015). Habits are formed by brain and mind and notified by environment, can be drug and diets. parasympathetic Sympathometics, symnatholytics, and parasympathelytics can shape habit.

Drugs are agents that modify biochemical and structural functions of body system (Bereczkei et al., 2015). Drug seeking initially becomes volitional, progressively habitual and then compulsive (addiction) is from the nucleus accumbens to the dorsolateral striatum with endophenotypes related to cannabinoids, opioids and adenosine which are implicated in the regulation of striatal plasticity and habit formation (Fouyssac et al., 2007). However, adrenaline, an adrenergic neurotransmitter secreted by adrenal medulla is responsible for perception of fear and flight. Sympathomimetic drugs are amphetamine, ephedrine, cocaine, cathinone which cause euphoria, an intense excitement and happiness, which is reactionary. When the affected person becomes addicted "compulsive use of drugs", the tendency for forgiveness may be lacking, leading to further chance of motivating resultant psychopathy. Right amygdala is responsible for fear processing! A J-shaped relationship for increasing wine, beer and vascular risk in dose-response fashion has been established (Costango et al., 2011). Organ donors with type 1 diabetes are associated with illicit drug abuse and suicide (Jacobsen et al., 2017). Selective serotonin reuptake inhibitors (SSRIs) cause suicidality, hostility, agitation and mania (Bostwick, 2006). Psychotropic drugs motivate violence, cause medical illness including psychiatric disorders can be treated by psychotropic drugs (CCHR, 2006). Emotional stress associated with a chronic illness or painful condition alters patient's temperament (Dorman, 2002). Psychotropic drugs could also cause violence and suicide in soldiers, vets (CCHR) and medical residency trainees (Yaghmour et al., 2017). Drug addiction is associated with mood swing, depression, suicidality and conflict (Cantao and Bolti, 2016) and overdose could cause suicide with respect to age, sex and country (Varnik et al., 2011).

#### Drugs cause obsession

Obsession is a state of preoccupying someone in mind to a disturbing extent. Compulsivity is caused by imbalance between brain's goal directed and habit-learning system and could be affected by stress and anxiety (Gilan el al., 2016). However, addiction is a brain maladaptive, functional, reorganizational process in reward-related habit, executive control (Yalachkov et al., 2007). Chronic stress increases dendritic complexity that may facilitate the recruitment of habit and addiction related neurocircutries through neuronal restructuring of the striatum (Taylor et al., 2014). Both ventral striatal and central nucleus pathways of the amygdala control habit (Belin et al., 2013).

Dopamine, a neurotransmitter released from negro-striatal pathway is used in treatment of Parkinson's disease (PD) and may cause obsessive-compulsive disorders such as gambling and sexual activity. Dopamine agonists such as pramipexole, ropinirole, amphetamine and cocaine when taken in large doses for a long time can cause schizophrenia characterized by behavioral (social isolation, hostility, lack of restraint) cognitive (delusion, amnesia, mental confusion, false belief of superiority), mood (anger, anxiety, apathy), psychological (paranoia, fear, depression, hallucination, delusion) and speech (circumstantial, incoherent, rapid and frenzied speech). Altered dopamine (D1) receptor activity agonist or antagonist in basolateral amygdala may impair fear suppression (Ng et al., 2018). Midbrain dopamine signaling maintains motivation of ongoing bouts (Fischbach - Weiss et al., 2017). Addiction is a chronic brain disease with strong genetic, neurodevelopmental and sociocultural components. Drugs of abuse triggers supraphysiologic surges of dopamine in the nucleus accumbens, which activates direct striatal pathway via D1 receptors and inhibits the indirect striato-cortical pathway via D2 receptors. Repeated intake triggers glutamatergic inputs to the striatum and midbrain dopamine neurone (Volkow and Morales, 2015). The neurotransmitters responsible for addiction are dopamine, serotonin, gammaaminobutyric acid, acetylcholine, oxytocin, nociceptin, substance P, hypocretin, norepinephrine, dynorphin, corticotropin-releasing factor, glutamate, endocannabinoids, neuropeptide Y and opioids (Koob and Volkow, 2016). Theory of mind is the ability to make inference about the mental states of others in order to predict their behaviour. An individual difference in spontaneous mentalization correlates with Machiavellianism. Therefore, those who have a stronger motivation for putting themselves into the mind of others can mislead and exploit them (Esperger and Bereczkei, 2011).

#### Drug Addiction is mediated via Neuron

Neuronal has to do with neuron, a specialized nerve that transmits nerve impulse. Neural transition of reinforcement for drug addiction may depend on the neuroplasticity in both cortical and striatal structures induced by chronic selfadministration of drugs (Everitt and Robbins, 2005). The imbalance between ins and outs of the striatum is responsible for drug addiction (larger et al., 2015). Threatening, reactionary, unforgiving, motivating psychopathy is a neuropsychological disorder that has do with neuronal modulation or damage caused by drugs, stress, or aging. The pathway is nigrostriatal, including right amygdala, anterior cingulate, dorsal striatum, dorsal lateral prefrontal cortex, inferior frontal gyrus, insular and nucleus accumbens. Drugs that are associated with increased suicidal ideations are also associated with increased suicidal attempts (Robertson and Allison, 2009). Anaesthetics, sedatives, tranquilizers and anticonvulsants act via NMDA glutamate excitatory system or the GABA inhibitory system can cause large number of neurons to die by apoptosis, especially during the first trimester and first several years at birth (Olney et al., 2004). Drugs, alcohol and suicide represent growing share of U.S. mortality (Monnat, 2017). Takotsubo cardiomyopathy could complicate drug-induced suicidal attempt (Roman et al., 2013). Aging "to grow older" is a continuous physiological

process that affects all the organs. As one is aging, the brain mass decreases and invariably the function decreases, leading to Alzheimer disease (senile dementia) with characteristics similar to that of schizophrenia.

## The Role of Lymbic System in Drug Addiction

Stress and depression cause dendritic loss and atrophy and decreased glial cells in the hippocampus and prefrontal cortex, affecting the function of nucleus accumbens and hypothalamus. Conversely, stress could cause increased denditric arborization and new synapse formation in the amygdala, amplifying the function of this structure. These paradoxical neurohistological changes can cause anhedonia, amotivation, anxiety, fear, cognitive deficits that characterize depression (Andrade and Rao., 2010). Basolateral amygdala-insular cortex supports parallel association in driving stimulus outcome versus stimulusresponse associations within and between individuals (Nasser et al., 2018). The phasic dopamine signal functions more to signal violation of expectancies, to drive real-world associations between events (Sharp and Schoenbaum, 2018). The medial prefrontal cortex coordinates goal directed behavior mediated by dopamine release in the nucleus accumbens in a complex frequency and dose dependent manner (Hill et al., 2017). Drugs that affect limbic system are eltoprazine, tramadol among others (Korte et al., 2016).

### **Disorders caused by Drug Addiction**

Disorder, lack of order or an illness is related to Threatening, Reactionary, Unforgiving, Motivating, Psychopathy. The neuropsychosocial disorders are stress, anxiety, somatoform, dissociative, sexual dysfunction, personality, schizophrenic, paranoid organic brain, affective, mental retardation, child and adolescent disorders (Mahmood, 2008), which may have implications of attention deficit and hyperactivity disorder (ADHD), alcoholism (triggering transmitters), autism (a mind unaware of itself and others), Deja vu (true hallucinations), dyslexia (an island of disability within an ocean of competence), handedness (left turn signals), perfect pitch (turned in the genes), photographic memory (data , data everywhere), seasonal affective disorder (the winter blues) and synesthesia (when the notes have colors and letters make pictures) (Bragdon, 2003).Psychopathy is a personality disorder characterized by egotistical trait, impaired empathy, antisocial behavior. Psychopathy is a component of the dark triad. But Machiavellianism is characterized by cooperation with partners in a Trust game associated with dorsal lateral prefrontal cortex and utilization of competitive strategies in the inferior frontal gyrus. Other components are narcissism, characterized by lack of awareness of his personality predicament, behavior and effect.

## Treatment of disorders caused by Drug Addiction

Dorsolateral and dorsomedial striatum histone deacetylase (HDAC) negatively regulates transcriptional process underlying

habit formation. HDAC3 may be targeted for prevention or reverse of maladaptive compulsive behavior (Malvaeg and Wassum, 2018). Cells inherit molecular memories of previously experienced conditions linked to histone variants and DNA replication (Velamis and Goodrich, 2017). The detection of a mismatch between our predictions and realities allows to learn from our error and it is a function of midbrain dopamine neurons which encode multiple types of errors signals and contribute to multiple forms of error - driven learning (Keiflin and Janak, 2017). Dopamine prediction errors reflect more dimensions of an expected outcome (vector) than scalar reward value (Langdon et al., 2018). . There is no clear evidence of an association between antiepileptic drugs and increased risk of suicide due to clinical and methodological heterogeneity (Ferrer et al., 2014). Waiting and stopping impulsivity are regulated by increased chatecholamine release in the prefrontal cortex and dopamine release in the nucleus accumbens and decreases motivation for reward and waiting impulsivity, but increases stopping impulsivity (Korte et al., 2017). Anterior cingulate is responsible for nicotine reversal of ethanol - induced learning deficits. In addition, the anterior cingulate, dorsal hippocampus and ventral hippocampus mediate drug-induced changes in anxiety (Gulick and Gould, 2011). Statins may lower risk of developing depression (Yang et al; 2018). Behaviour represents the response of a particular brain to an environment (Carr, 1983). Group work with population at risk (Grief and Ephross, 1997) may be associated with that requires self-control, which involves socialization, cognitive variables (cause - effect relations) and emotion regulation (Nenar and Keng, 2000). Piroxicam has both inhibitory and excitatory effects on CNS (Saganuwan and Orinya, 2015) hence can be used in the treatment of diseases associated with CNS depression and excitation (Saganuwan, 2017a; 2017b) which is based on change of functional group (Saganuwan, 2017c).

### **Drug Addiction and Law**

The spiral model of behavioral changes are precontemplation, contemplation, preparation and action (Banyard, 1996) which are routine, repetition and relaxation based (Ross, 1984). The treatment of disorders caused by drug addiction requires critical counseling and psychotherapy (Corey, 1990). But taking action to avoid troubles is the most important step of the peer pressure reversal (Scott, 1985) as drug addiction could lead to neonaticide, homicide, infanticide and filicide (Mckee, 2006). Dementia is an abnormal condition marked by multiple cognitive deficits that include memory impairment. It is seen in 15% of people over 65years (Weiten, 2007). However, motor control emerges from interaction between the individual, the task and the environment (Shumway-Cook and Woollacott, 1995). Psychosocial problems could be solved via interaction leading to conflict resolution (Pettijohn, 1998). Over 1000 American kids have lost parents in the Iraq war (Junn and Boyatzis, 2006), unveiling informational, normative social influence and emergencies by dissecting and breaking the rules (Aronson et al., 2010) that can help solving neuropsychosocial problems that would avoid 3rd global war. All these are dependent on personality and personal growth (Frayrer and Fadiman, 1998).

#### **HIV-Associated psychosis**

N - myc downstream regulated gene 2 (NDRG2) fused with TAT protein (TAT-NDRG2) can be used to treat brain problem (Carey et al., 2013). Trans-activator of transcription (TAT) implicated in neuro-pathogenesis of HIV-I infection damages neuron and impairs learning and memory by reducing gray matter density in the sublenticular extended amvgdala. amygdala, amygdala \_ hypocampal piriform, area. perilentorhinal cortices and hypothalamus in mice (Carey et al., 2012). TAT interaction with opioids potentiates neuroinflammation and neurodegeneration CNS via C-C chemokine receptor type 5 (CCR5). Morphine caused increase in endogenous CCR5 chemokine ligands (CCL3, CCL4, CCL5 and CCL2). But maraviroc attenuated the cytokines indicating that CCR5 mediates HIV - I TAT- induced alterations has antinociceptive potency and rewarding properties of opioids (El-Amine et al., 2018). The HIV-1 TAT induced dysfunction of mesolimbic dopaminergic pathway impaired reward processes and contributed to methamphetamic abuse in HIV-human. Dopamine adenosine receptor interactions and neuronal recruitment represents target for treatment of amphetamine abuse in HIV humans. The pathway is via nucleus accumbens, caudate putamen and ventral tegmental area (Farokninejad et al., 2017).TAT modulate the function of dopamine transporter and damage dopamine - rich regions of the CNS, hence may cause Parkinsonism (Bland, 1986).

### Mediation of neurotransmitters in HIVassociated psychosis

Neurodegenerative diseases are irreversible as seen in HIV infection that involves glial cells and macrophages (Fitting et al., 2010). HIV-TAT protein induced sensorimotor deficits associated with acute and persistent neuro inflammation in limbic and extralimbic parts of brain (Gaskil et al., 2017). It also mediates cognitive abnormalities observed in HIV infected individuals (Gonek et al., 2017).TAT expression decreased dopamine in caudate putamen, increased serotonin in the hippocampus and increased conversion of glutamate to glutamine in all regions of the brain cells, whereas selegiline decreased serotonin metabolism. TAT-induced alterations in glutamate signaling and facilitates reversal learning (Gupta & Kulhara, 2007). Therefore, treatment of HIV-induced psychosis may be by inhibition of both postsynaptic dopamine receptors and presynaptic ether-a-go-go (erg) potassium (K) channels (Hahn et al., 2016). The human face receives sensory information from the environment, which is transmitted to the cortex (Hothersall et al., 2017) HIV-I TAT alters the intrinsic capacity of mu-opioid-receptors signaling in response to agonist binding via beta-arrestin-2 function (Huang et al., 2018). HIV-TAT disrupts blood brain barrier integrity and causes phagocytosis, microlysis and increased perivascular macrophages (Kesby et al., 2016).

TAT induced oxidative stress, DNA damage and chromosomal aberrations in HIV-I infected individuals (Kesby et al., 2015). Pathogenic role of methamphetamine promotes cardiac left ventricular dysfunction greater than TAT-induced effects (Kesby et al., 2017). TAT expression leads to reward deficits (Koczor et al.. 2015), disrupts mu and kappa, receptors, proopiomelanocortin, proenkephalin and prodynorphin transcript level in cortex, hippocampus and striatum. The abnormality of dendrocytes and reduction in spine density caused by TAT/morphine is responsible for neurodegenerative changes in neuro AID and may exacerbate neurological imparinats in HIV patients who abuse opioids (Liebrand et al., 2017). However, heterodimerization of the kappa opioid receptor and neurotensin receptor I contributes to a novel βarrestin -2-biased pathway (Liu et al., 2016). Human HSP 70-2 (chaperone) expressed in the CNS when added to human neuroblastomas offered protection against hydroxydopamine stress (Meng et al., 2017). Residues W1320 and Y328 on the mureceptor influenced opiate ligand bias by DAMGO increasing relative β-arrestin 2 activity at the W320A mutant and endomorphin - I gaining activity with Y328F. Therefore, endomorphin - 2 was involved in a directional shift from cAMP bias towards β-arrestin 2 at W320A (Miller, 1987). TAT enhanced delivery of the Cterminus of HDAg-I inhibited hepatitis D2 virus and may have therapeutic potential against HDV infection (Nath & Steiner, 2014). Signifying that a co-infection of HIV and HDV may help in elimination of the latter and proffer immunity against HDV infection.

TAT-haFGE14-154 upregulated ADAM 10 and attenuated Alzheimer phenotype of App/PS mice via neuro protection pathway (NCA, 2007). In vivo exision of HIV-I proviral DNA by sg RNAs/SsaCas9 in solid tissues achieved via AA V delivery may serve as a guide towards having lasting solution for HIV infection (Paris et al., 2015). Memory changes produced in the hippocampus may result from interaction of stimulation of the reward centre via inhibition of drive sTATes in the frontal lobe and association with the drive sTATes in the limbic system (Saganuwan and Onyeyili, 2014)). The common pathway of mechanisms actions of drugs of abuse is via dopamine in the limbic system to which may be therapeutically targeted in abuse treatment (Shepard et al., 2007). Severe infection can cause nerve hypersensitivity syndromes and chronic pain disorders (Siemionon et al. 2011; Vigorito et al., 2015), which may also affect theta cells in the hippocampal area that is sensorimotor and cause abnormal motor movement (Yin et al., 2017).

#### Conclusion

Drugs that act via corticosteroidal, limbic and mesolimbic pathways including sympathomimetics, sympatholytics, parasympathetics and parasympatholytics could change habit. Sympathomimetics and parasympatholytics increase systolic and diastolic pressure when challenges are met, whereas parasympathomimetics and sympatholytics decrease systolic pressure as well as systole and diastole when challenges are faced. Decreased systole and diastole could be responsible for criminal mind and behaviour which are functions of brain.

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