

# Autism Spectrum Disorder

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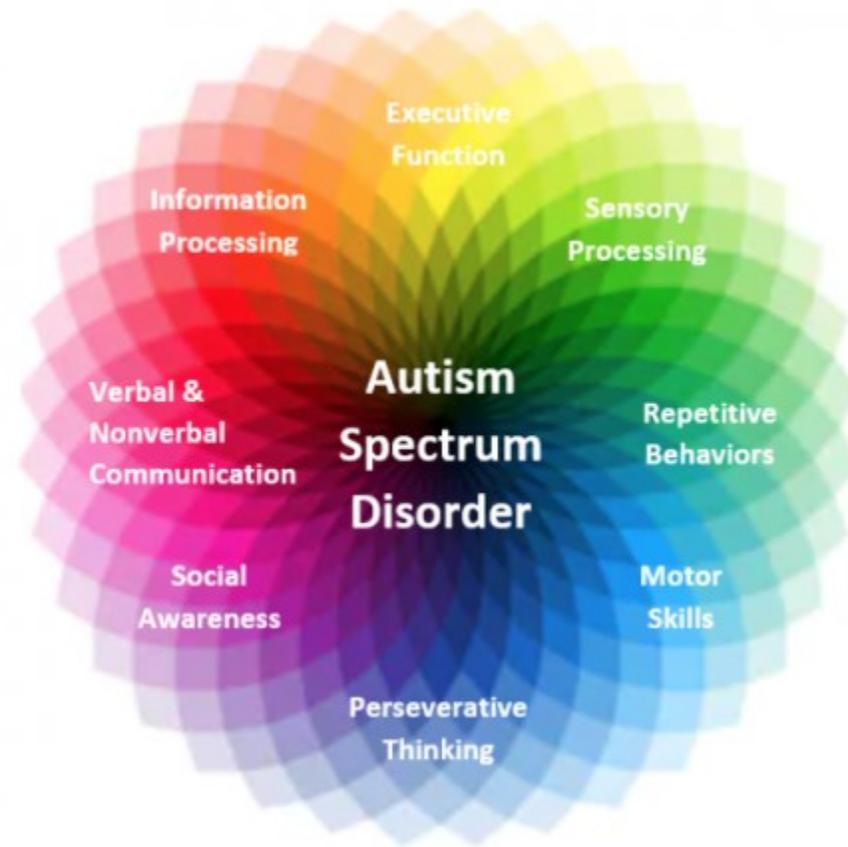
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# Introduction

- Autism is a neurodevelopmental disorder characterized by early-onset persistent impairment in social communication, interaction, and restricted, repetitive pattern of behaviour.

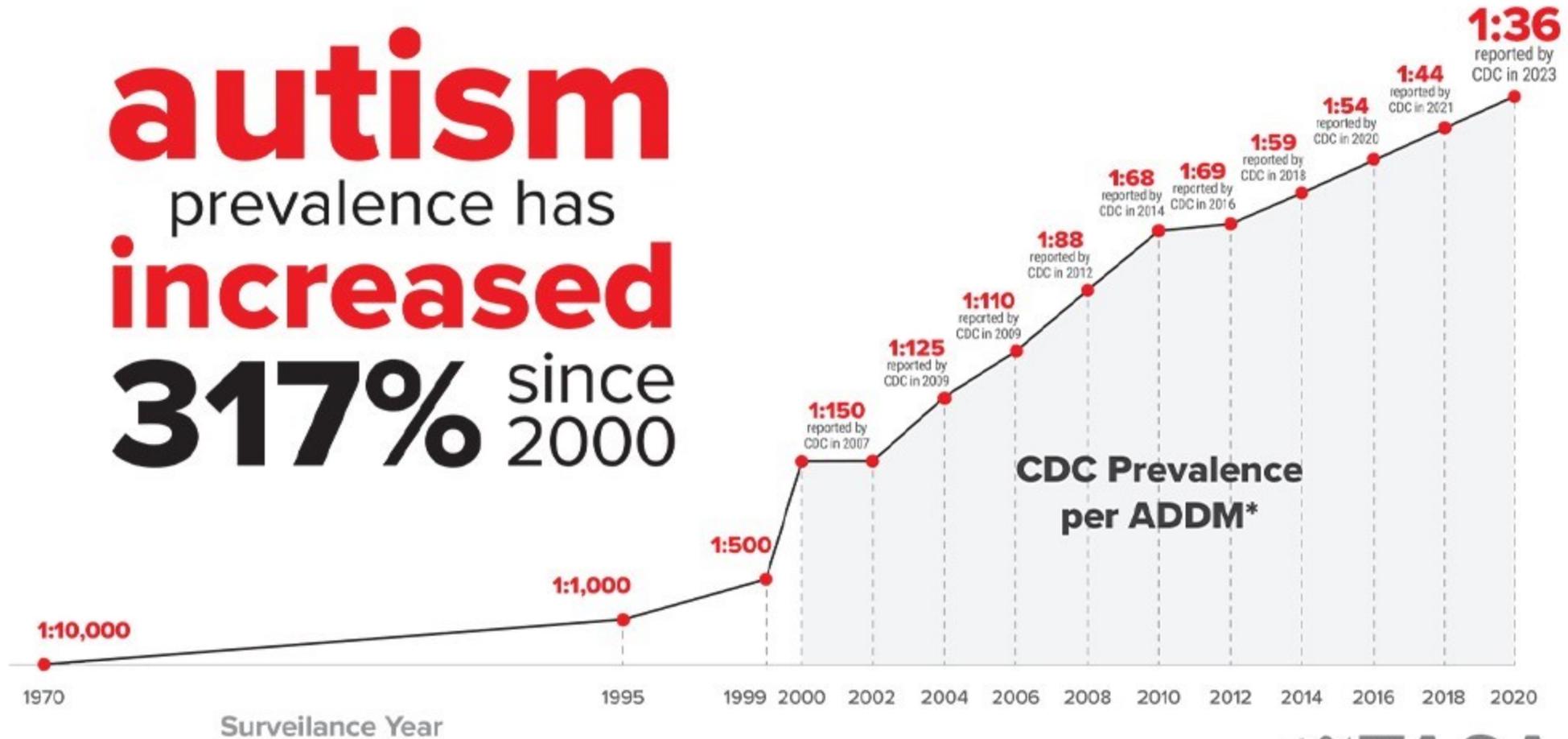
# Characteristics of ASD



# Statistics

- The leading cause of disability among all mental disorders in the less than 5-year age group is autism spectrum disorder in USA. Recent CDC data shows 1 in 36 children 8 years of age
- As of 2018, about 1 in 450 children under the age of 10 have autism spectrum disorder in India

**autism**  
prevalence has  
**increased**  
**317%** since  
2000



\*ADDM (Autism and Development Disabilities Monitoring Network)



# Prevalence world over

- Iceland 13.2 per 10K in 2001 1 in 758
- Portugal 16.6 per 10K in 2007 1 in 602
- Brazil 27.2 per 10K, Sao Paolo schools, 2011 1 in 368
- Australia 45 per 10K, 2 studies 2004 and 2011 1 in 222
- Canada 64.9 per 10K, Montreal schools 2009 1 in 154
- Denmark 68 per 10K, 2011 Psychiatry register 1 in 147
- Sweden 72 per 10K, all children in city in 1999 1 in 139
- 80 per 10K in 2012 1 in 125
- UK 94 per 10K, Cambridgeshire schools 2009 1 in 106
- US 168 per 10K, rates variable, Baio 2018 1 in 59

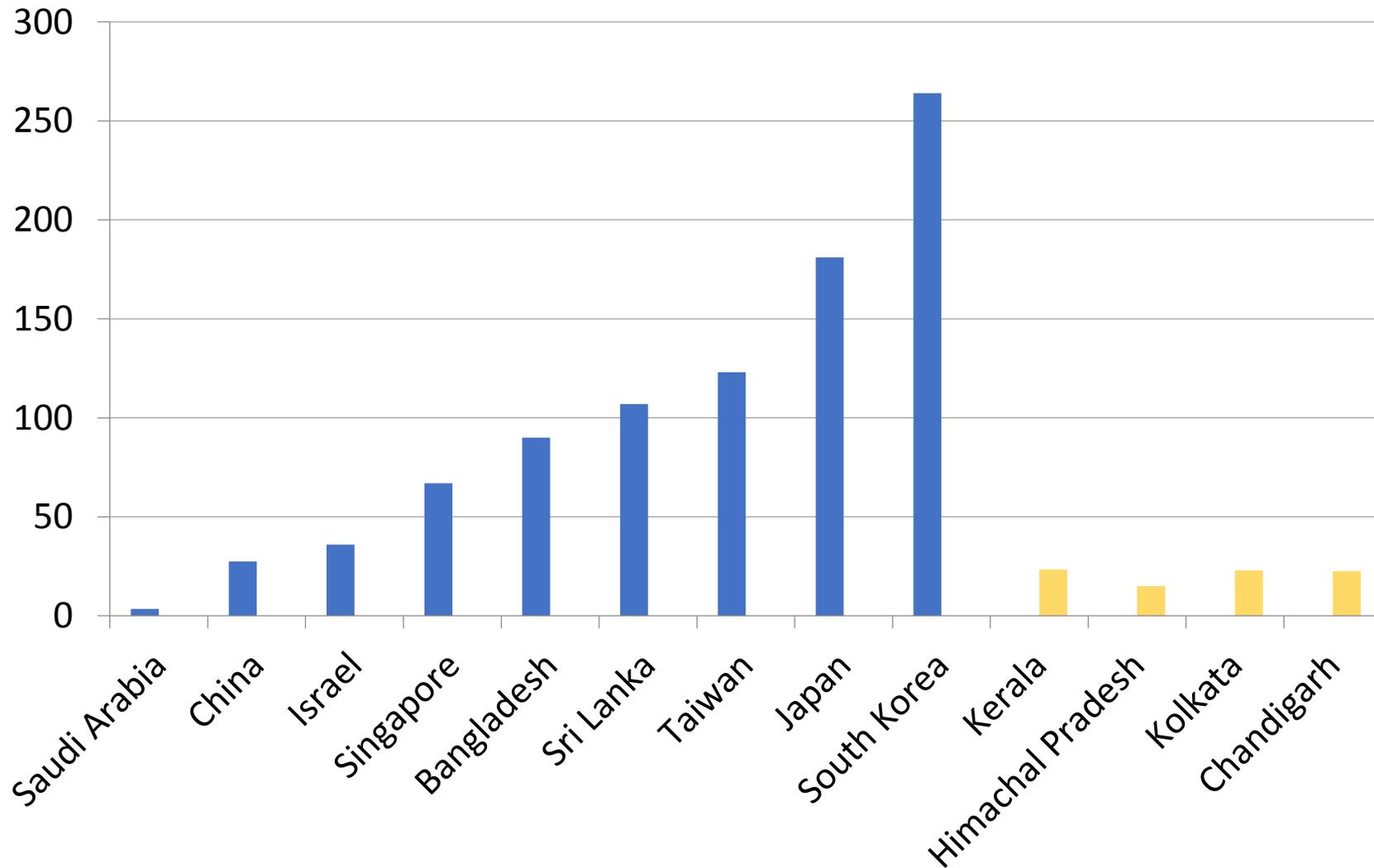
# Prevalence in Asia (per 10,000)

- Saudi Arabia 3.5
- India 10-23
- China 27.5
- Israel 36
- Singapore 67
- Bangladesh 90
- UK 94
- Sri Lanka 107
- Taiwan 123
- USA 168
- Japan 181
- South Korea 264

# India

- Prevalence studies in community
- Himachal Pradesh urban, rural and tribal population 15 per 10000
- Kolkata-school children 23 per 10000
- Kerala- Semi-urban community 23.3 per 10000 (10 per 10000)
- Chandigarh Autism Spectrum Disorder study- children in community 22.5 per 10000

# Prevalence in Asia per 10000



# Nosological Status

Pervasive developmental disorders		Autism spectrum disorders	
DSM-IV (1994-2000) DSM-IV-TR (2000-2013)	ICD-10 (1996-till date)	DSM-5 (2013-till date)	ICD 11 (2019 onwards)
299.00 autistic disorder	F84.0 childhood autism	299.00 autism spectrum disorder	6A02 autism spectrum disorder
299.80 Asperger's disorder	F84.5 Asperger syndrome		6A02.0 Autism spectrum disorder without disorder of intellectual development and with mild or no impairment of functional language
299.80 pervasive developmental disorder - not otherwise specified (including atypical autism) - PDD-NOS	F84.1 atypical autism		6A02.1 Autism spectrum disorder with disorder of intellectual development and with mild or no impairment of functional language
299.80 Rett's disorder	F84.8 other pervasive developmental disorders		6A02.2 Autism spectrum disorder without disorder of intellectual development and with impaired functional language
299.10 childhood disintegrative disorder	F84.9 pervasive developmental disorders, unspecified		6A02.3 Autism spectrum disorder with disorder of intellectual development and with impaired functional language
	F84.4 overactive disorder associated with mental retardation and stereotyped movements		6A02.4 Autism spectrum disorder without disorder of intellectual development and with absence of functional language
	F84.2 Rett's syndrome		6A02.5 Autism spectrum disorder with disorder of intellectual development and with absence of functional language
	F84.3 childhood disintegrative disorder		6A02.Y other specified autism spectrum disorder

DSM – Diagnostic and statistical manual of mental disorders; ICD – International Classification of Diseases

DSM 5 TR - same criteria as DSM 5

# Instruments

- Gold standard instruments like Autism Diagnostic Interview, Autism Diagnostic Observation Schedule, and Childhood Autism Rating Scale used to diagnose and characterize autistic phenotypes are expensive and, hence, unaffordable in the Indian set up.
- Two indigenous scales have been validated and made available free of cost, International Clinical Epidemiology Network Diagnostic Tool for autism Spectrum Disorder (INDT-Autism Spectrum disorders [ASD]) and the Indian Scale for Assessment of Autism (ISAA).
- The government of India has issued guidelines for using these scales for assessment and disability certification in autism.
- Indian Autism Screening Questionnaire – 10 items (3-18 years), same dataset as ISAA
- Chandigarh Autism Screening Instrument (CASI) – 37 items(1.5-10 years)
- CASI-Bref – 4 item
- ISAQ- Indian Autism Screening Questionnaire-10 item

# Etiological Variables

- **Multifactorial Inheritance**
- Environmental Factor & Genetic Interaction
- Epigenetic factors

## **Genetic**

- Autosomal dominant/recessive
- Sex-linked dominant/recessive

## • **Environmental Factors**

- **Toxins; Gene Mutation**
- **Trauma**
- **Diets; Foods**
- **Radiation**
- **Lead**
- **Chemicals in Groundwater**

# Psychological theories

- A **lack of a central drive for coherence**, with the consequent focus on dissociated fragments rather than integrated “wholes,” leading to a fragmentary and overly concrete experience of the world
- **Deficits in executive functioning**, that is, in the capacity for abstracting rules, inhibiting irrelevant responses, shifting attention and profiting from feedback, and maintaining a focus on multiple aspects of information in decision making.

# Heredity

- Scientists have observed a concordance for autism of about **60% to 90% in monozygotic twins.**
- They have also observed a concordance for autism of about **5% to 10% in dizygotic twins .**
- Heredity or genetic factors are responsible for the 90% of autism cases.
- Similar results, from family research, show that the percentage of autistic siblings is about 2% to 7%, much higher than the percentage in general population (0.5%).

# Contd...

- Recent specific findings regarding **neuroligins, shank3, contactin associated protein 2, and neurexin 1**, and a growing understanding of the biology of the fragile X mental retardation 1 (FMR1) gene have provided the first concrete insights into the molecular and cellular pathology underlying autism.
- It is clear that **no single gene accounts for a majority** of affected individuals. **Relative contribution of genes** is thought to be quite large, influences other than variation in the deoxyribonucleic acid (DNA) sequence are likely to turn out to be important as well, including epigenetic mechanisms and environmental factors.
- Indeed, one of the most important outcomes of the successful search for autism transcripts will be the light it will shed on **nongenetic, potentially modifiable risks**.
- Evidence of multiple genetic subtypes, Show support for autism gene on **chromosome 7**, less compelling evidence for gene on chromosome 3,4,11

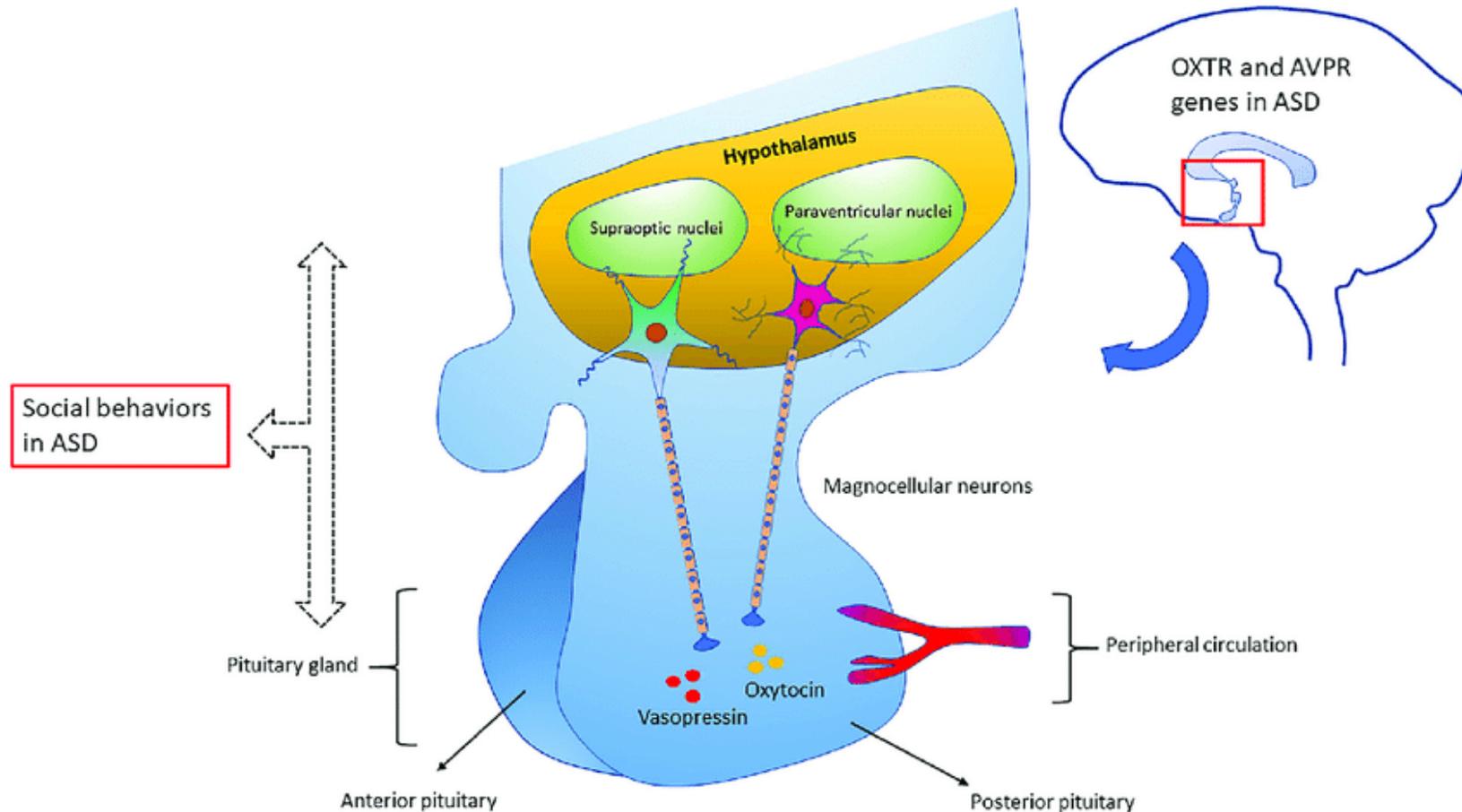
# Neurochemistry

- Increase in peripheral level **of serotonin, significance is unclear.**
- **Hyperdopaminergic** state of brain explain over activity and stereotyped movement seen in autism.
- **Dopamine blockers** are effective in reducing the stereotyped behavior.
- Possibility that **endogenous opioid cause social withdrawal and unusual sensitivity to environment.** This was rationale for use of naltrexone (opioid antagonist) in treating children with autism.

# New Research Breakthroughs

- The Cell Danger Response (CDR) hypothesis is reviewed as a new unifying theory for the cause and treatment of autism.
- evolutionarily conserved metabolic response that protects cells and hosts from harm. It is triggered by encounters with chemical, physical, or biological threats that exceed the cellular capacity for homeostasis.
- The concept of functionally polarized, M1 (pro-inflammatory) and M2 (anti-inflammatory) mitochondria, is introduced.

# Oxytocin and vasopressin (OT-AVP)



Oxytocin and vasopressin (OT-AVP) pathway associated with social behavior in ASD. In the hypothalamus, magnocellular neurons originating from paraventricular and supraoptic nuclei release oxytocin and vasopressin in the posterior pituitary which then goes into the peripheral circulation. Any deficiencies in oxytocin or vasopressin levels contribute to ASD's social behavioral impairments.

# Biomarkers

- Elevated serotonin in whole blood, almost exclusively in the platelets.
- Because 5-HT is known to be involved in brain development, it is possible that the changes in 5-HT regulation may lead to alterations in neuronal migration and growth in the brain.
- Several studies found increased total brain volume in children younger than 4 years of age with ASD,
- About age 5 years, however, 15 to 20 percent of children with autism spectrum disorder developed macrocephaly.
- Increased size of amygdala in the first few years of life, followed by a decrease in size over time.
- The size of the striatum has also been found in several studies to be enlarged in young children with autism spectrum disorder, with a positive correlation of striatal size with frequency of repetitive behaviors.

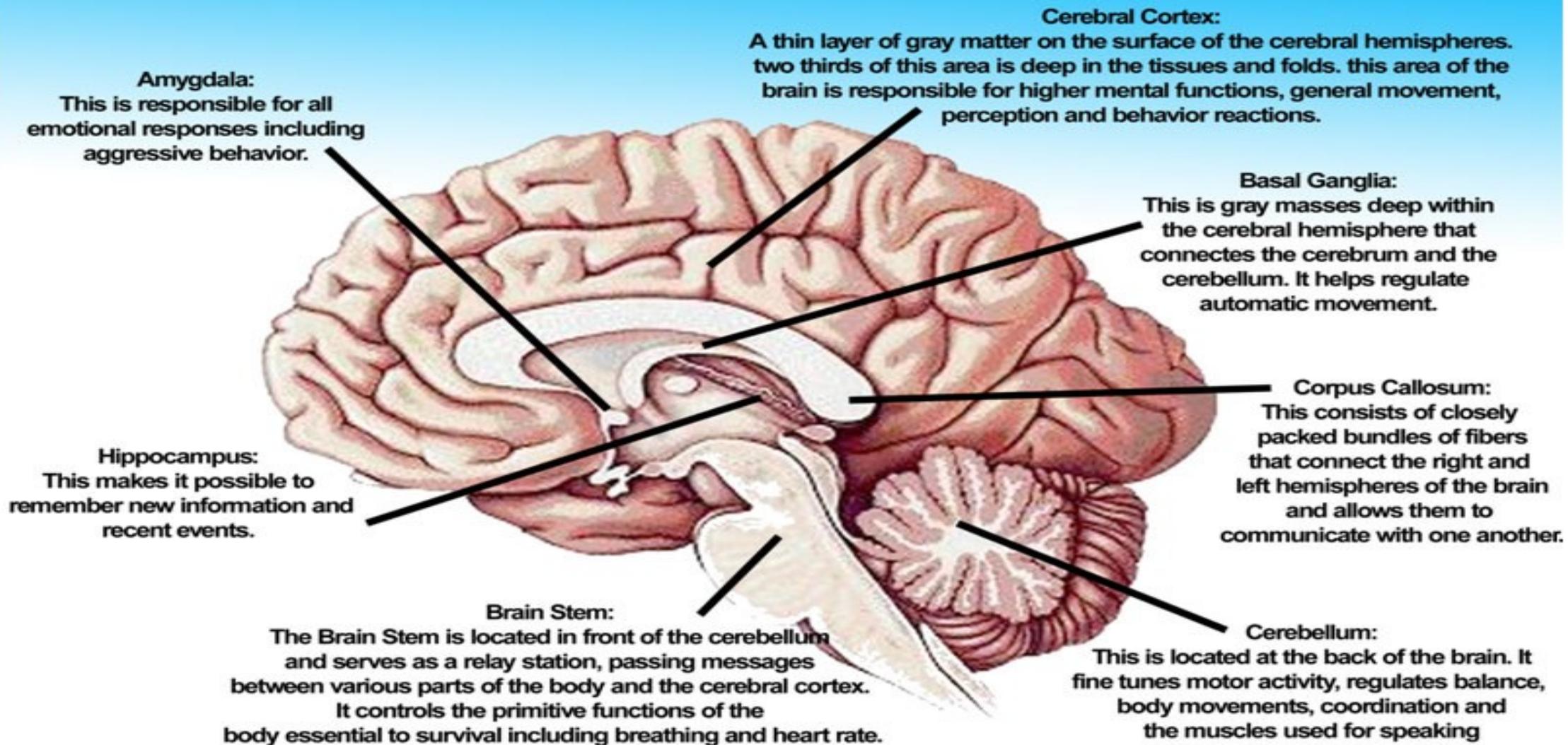
# Biomarkers

- fMRI studies have provided evidence that individuals with autism spectrum disorder have a tendency to scan faces differently
- they focus more on the mouth region of the face rather than on the eye region and
- rather than scan the entire face multiple times, individuals with autism spectrum disorder focus more on individual features of the face.
- In terms of “theory of mind,” fMRI studies find differences in activation in brain regions.
- Dysfunction of the mirror neuron system (MNS). MNS thought to be activated during imitation or observation of behaviors
- Atypical patterns of frontal lobe activation especially fusiform gyrus have been found in ASD during face processing tasks.

# Brain region of potential importance in autism

- **Amygdala**- Emotional arousal, emotion perception, and emotional learning
- **Extended amygdala, ventral striatum, and nucleus accumbens** -Social reward circuitry
- **Fusiform gyrus** -Face (person) recognition  
Social cognition
- **Superior temporal sulcus** -Interpreting biological movement as a nonverbal communication, including: Direction of eye gaze, facial expressions, hand, head, and body gestures.
- **Orbital prefrontal cortex**- Emotional learning
- **Medial prefrontal cortex** -Social cognition (interpreting what others might be thinking and feeling)
- **Lateral convexity of prefrontal cortex Mirror neuron network**, - action comprehension

# Parts of the Brain Affected by Autism



# Do Vaccines Cause Autism?

- Danish Study suggests no link between autism and thimerosal an organomercury compound and established antiseptic and antifungal agent
- Eliminated from vaccines in 2001; no decline in incidence of autism
- Non-vaccinated children at greater risk to contract viral infections
- Estimated 1 in 4 children in US **non** compliance with vaccination guidelines due to fear of ASD

# Placenta research

- A placenta with four or more trophoblast inclusions conservatively predicts an infant with a 96.7% probability of being at risk for autism.
- Currently, the best early marker of autism risk is family history. Couples with a child with autism are nine times more likely to have another child with autism.
- Epigenetic mechanisms are associated
- Research on kinesthetic movements while playing video games for early identification

# Diagnosis

- AIIMS modified INCLIN-ASD
- DSM-5/ICD 11
- M-CHAT- for screening
- ISAA

## 299.00 AUTISM SPECTRUM DISORDER

- A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history
  - 1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.

- 2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
- 3. Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

- B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history
- 1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
- 2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).

- 3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
- 4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

- *Specify* current **severity**: Severity is based on social communication impairments and restricted, repetitive patterns of behavior. Severity level can be
- Requiring very substantial support
- Requiring substantial support
- Requiring support
- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).

- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

- *Specify* if:
- With or without accompanying **intellectual impairment**
- With or without accompanying **language impairment**
- Associated with a known medical or genetic condition or environmental factor, additional code (MeCP2 gene, fragile X, intrauterine valproate exposure,
- Associated with another neurodevelopmental, mental, or behavioral disorder, additional code[s]

# Management

- **ASSESSMENT**

- Autism being a complex disorder, the assessment should as far as possible be done by **multidisciplinary team**
- Beyond longitudinal changes in ASD symptoms, the assessment of co-occurring physical and mental health conditions, is essential to providing quality care.
- In an individualized set-up, The psychiatrist can make good assessment and manage some therapies with specific referral as in small towns.



# Management

- Early intervention
- Diagnosis of ASD and associated conditions
- Early diagnosis of and interventions for autism are more likely to have major long-term positive effects on ~~symptoms~~ characteristics and later skills.
- Early intervention may begin as early as 2 years of age
- Because of the plasticity of brain, treatments have a better chance of being effective in the longer term.
- Early interventions not only give children the best start possible, but also the best chance of developing to their full potential.

- Rule-out other conditions (e.g., hearing impairment), evaluate for co-morbid conditions (e.g., seizures), and search for underlying etiology (e.g., genetic syndrome).
- A medical history (birth, current health, and family history), physical examination (growth, dysmorphic features, neuro, and skin evaluation) and audiological evaluation, genetic testing (chromosomes, fragile x, microarray), and other optional investigations such as electroencephalography, brain imaging, metabolic testing, as appropriate might be useful depending on the nature of the case.

- Some features related to ASD require additional assessment, including the presence of cognitive or language impairment (or both).
- The presence of developmental delays or co-occurring diagnoses, such as attention deficit and hyperactivity disorder (ADHD), in addition to ASD symptoms, may add complexity to the diagnostic assessment process.
- Given these complexities, cognitive and language assessments and consideration of comorbid emotional and behavioral disorders are recommended for all patients with ASD.

# Case

- PR, 16 yrs male, student of 11<sup>th</sup> class, normal milestones
- Does not interact with others at school
- Head banging
- Started getting violent thoughts of murder or kidnapping girls, wanted to be like Hitler
- Would do strange gesture to prevent bad events from happening
- OC symptoms- checking, washing excessively
- Wants things in pairs e.g. magazines, scooter
- Would insist that mother should be around
- Would not go to meet relatives
- Initial diagnosis – OCD , later revised to Asperger syndrome

# Case

- 14 years old boy, from Jalandhar
- Normal milestones
- Refusing to go to school
- To watch TV whole day
- Not studying, no friends
- No other problem behavior
- ?Behavioral problem
- Asperger syndrome

# Case

- 3 and half year old boy
- Speaks only 2 words
- Motor mile stones normal
- Spends excessive time on mobile
- Hyperactivity present, hence not attending play group
- Joint attention +, emotionality normal, follows commands
- Diagnosis- language delay

# Case

- 2 year old child
- Delayed mile stones
- No play
- Responds to calling
- Cries when hungry
- Eye contact +, emotional attachment with parents +
- Diagnosis- Intellectual disability

# Case

- Case 1. GS, 7 years, male child was brought by parents with c/o delayed onset of speech, difficulty in learning, inattention, difficulty in writing, less peer interaction, can not answer back to younger children, poor voice modulation, repeats words, sensory issues, excessive jumping when excited, vocal and facial tics present, eye contact less with teachers
- In past had received a diagnosis of mild autism based on CARS
- MIQ 92
- Diagnosis – ADHD inattention type

# Case

- Case 2- PN, 6 years old female child was brought by parents as she would not sit still, delayed mile stones, speech 2 word sentences at 4-5 years, remains lost in self, laughs without reason, poor in academics, adamant behavior
- IQ testing, GDT 110, VSMS 68, MISIC verbal 83
- ISAA score 89
- Borderline intelligence

# Case

- Case 3 GK, 8 years old female child presented with not talking to any one for 4 years, doing well academically, no friends in school, keep sitting silently in class, does not look up to father when he comes to pick her up after school, does not ask for food or water in school.
- Talks to parents at home but becomes quiet in presence of other family members, hides behind her mother in social gatherings
- Laughs at funny situations, gives eraser etc when a child in class asks for it
- IQ = 110
- On ISAA score 72 Mild autism
- Diagnosis- Selective mutism

# Case

- Case 4: AS, 5 years old male child brought to OPD as he was not speaking adequately, not able to understand much, poor eye contact, poor attention span
- Had jaundice at the age of 3 years
- Asks for food, plays adequately with other children
- Speech was unclear
- SQ=52
- On ISAA score 87 Mild autism
- Diagnosis- Mild MR

- Prevalence of ADHD symptoms in individuals with a primary clinical diagnosis of ASD has been reported to be between 13% and 50% in the general population.
- When in doubt, the intervention can be started, and a diagnosis can be made later
- Similarly, it is difficult to differentiate between intellectual disability and ASD at times, and the comorbidity is very high, around 30%–45%.
- cognitive ability and intellect in autism- needs to be assessed on a battery of tests

- After detail history, clinical examination, play observation, it is important to ask parents about the reason for coming
- Reconfirmation of diagnosis
- Treatment
- Certification
- School had asked for a report
- Need to make important decisions about school, place of stay, therapies
- They are in town for a month and need a specific guidance
- Parents to write important concerns and how a usual day goes by

## PSYCHO-EDUCATION FOR THE FAMILY

- ▶ Informing the diagnosis to parents when their child has ASD.
- ▶ A few points to be kept in mind while informing them are:
  - Autism is a neuro-developmental disability- is lifelong and starts in utero
  - It is not produced by vaccines
  - It is not caused by bad parenting or due to behavior of other family members
  - All children may not be similar
  - Early therapy helps
  - Education may not be the only aim
  - Talk to others about ASD openly

- Talk to other parents of children with ASD
- The path ahead may be difficult, but reach out for help at every step of the way
- Furnish examples of individuals with ASD
- Assess parental stress and address it
- Assess resources in terms of time, place, caregivers

# Non-pharmacological treatments

- These form the mainstay of approaches toward autism .
- The therapies which have a definitive role include—Behavior therapy, Occupational Therapy, Speech -language therapy, Applied Behavior Analysis, Social skills training, Physical Therapy, Cognitive- Behavior therapy, Play therapy .

# Non-pharmacological treatments

- **Structured educational and behavioral interventions**
- Early-stage Denver model
- Applied behavioral analysis (ABA)
- Social communication, emotional regulation, and transactional support (SCERTS)

- **Developmental interventions**

- These include therapies that focus on building emotional relationships, fostering social communication, and building social skills.
- Most commonly practiced are:
  - DIR/Floortime-Developmental,
  - individual difference,
  - relationship-based and
  - RDI-Relationship development intervention

- **Interventions for communication**

- sign language
- communication boards
- visual supports
- picture exchange communication system (PECS)
- use of social stories and
- social skills training.

- **Educational assistance**

- Structural educational approach with explicit teaching and formulation of individualized education plans is important for every child with autism.
- TEACHH – Treatment and education of Autistic and related Communication-handicapped Children.
- The goal of Structured TEACCHing is to promote meaningful engagement in activities, flexibility, independence, and self-efficacy.

- **Shadow teacher**

- **Sensory integration**

- the aim of sensory integration therapy is to improve the ability of the brain to process sensory information so the child will function more adaptively in his/her daily activities.

- **Others**

- Some evidence of CBT for anxiety and anger management in the high functioning youth with ASD
- Animal-assisted therapy, particularly the use of trained dogs, has been gaining increasing popularity.

# Management

- **Complementary and alternative treatments** have not been found to be mainstay

Example: special diets, herbal supplements, chiropractic care, arts therapy, mindfulness, or relaxation therapies.

# A-B-C APPROACH

- **Behavior controlled through changing antecedents**
  - Enriching the environment
  - Limiting the environment
  - Simplifying the environment
  - Structuring the environment
  - Address the child's sensory needs
- **Behavior controlled by changing consequences**
  - Operant conditioning
    - Differential reinforcement
    - Changes to the reinforcement schedule (Extinction, time out, response cost, and/or overcorrection)

# What behavior do we want to change?

- **Deficits**

- Language
- Play
- Social Skills
- Executive Functions



Skill Repertoire Instruction

- **Excesses**

- Self Stimulatory Behavior
- Maladaptive Behavior
  - Tantrums
  - Aggression
  - Noncompliance



Behavior Management

# Sensory Integration deficits and Behavior issues

- Hyper/hypo responsiveness to touch (tactile)
  - Doesn't let touch, wears only soft clothes, wears socks, toe-walking, has to wipe face many times while eating
  - Keeps rubbing various surfaces, no socks/chappals, likes hugging
- hyper/hypo responsiveness to sound (auditory)
  - Closes ears, cries on hearing loud sounds-whistle, lawn mower, DJ
  - Keeps making sounds, tapping
- atypical responses to visual stimuli (visual)
  - Likes to look at flickering lights, fan, running water, pokes own eyes, finger flicking
  - Shields side of the eyes

# Tactile issues

- Avoid getting messy in glue, sand, finger paint etc.
- Sensitive to certain fabrics (climbing, bedding)
- Touches people and objects at irritating level
- Avoids going barefoot, especially in grass or sand
- Decreased awareness of pain or temperature
- Finger painting
- Clay/Play-Doh/Putty
- Walking on the grass with no shoes
- “swim” and “dry off” with towel
- Texture adventure bins
- Glue projects

## **Vestibular and proprioceptive: Movement & Body Position**

- Become anxious or distressed when feet leave the ground
- Avoid climbing or jumping
- Avoid playground equipment's
- Seek all kinds of movement interfering with daily life
- Take excessive risks while playing
- Continually seek out all kinds of movement activities
- Hung on other people, furniture, objects, even in familiar situations

## **Vestibular Activities –**

- Any play with “leg” movements of Head, Shoulders, Knees and Toes
- Dancing (with head and trunk movement)
- Sit ‘n’ Spin
- Rolling
- Rocking Chair

## **Proprioceptive Activities –**

- Stair climbing and/or sliding
- Playing tug of war
- Pulling or Pushing
- Hitting a punching bag

## **Calming Techniques –**

- Help with heavy work
- Joint compression
- Lavender, vanilla, or banana scents
- Reduced noise or light levels
- Sucking through a straw

## **Sensory Diet –**

- sensory diet means finding the best combination and timing of various sensory inputs to cope with sensory integration dysfunction.
- A sensory diet - plan that includes an ordered progression of sensory and sensory-motor activities including a combination of alerting, organizing and calming techniques that fulfill physical and emotional needs.
- It helps in improving the attention span, attaining the sitting for learning, reducing the repetitive activities and meltdowns.

# Pharmacological Treatment of symptoms

- Repetitive stereotype behavior- No US FDA approved drug, SSRIs may help, Haloperidol, Risperidone, Aripiprazole
- Hyperactivity and inattention- Psychostimulants (Methyphenidate) can be given but no US FDA approved drug, clonidine, imipramine can be given
- Irritability, aggression, severe tantrums – Atypical antipsychotics are US FDA approved

- Core social impairments- No drug treatment approved by USFDA
- Unusual sleep pattern – melatonin
- Improvement in restricted, repetitive and stereotype pattern of behavior, activities and interests was seen in many studies
- Behavioral disorder and affect dysregulation
- Change social interaction and communication results variable

- Omega 3 fatty acids- In a meta-analysis (Cheng, 2017)- may improve hyperactivity, lethargy, and stereotypy. No improvement on GAF and social responsiveness. Effect size small
- Vitamin D- Two open label trials- efficacy in prevention, some improvement (Cannell, 2017)
- Gut microbiota- Probiotics- small studies (Fattoruso, 2019)
- Microbiota Transfer Therapy (MTT) that combined antibiotics, a bowel cleanse, a stomach-acid suppressant, and fecal microbiota transplant-study on 18 children who had GI symptoms (Kang, 2019)

# Management

Under research

- Some therapies which are still being studied are—
- IV Suramin,
- vasopressin receptor analogues,
- vasopressin receptor antagonists ,
- intranasal oxytocin ,
- TMS

**Both ICMR and Indian Psychiatric Society condone the use of stem cell therapy in autism based on the review of available scientific evidence.**

# Newer issues- Screen time

- Increase in screen time is associated with melanopsin-expressing neurons and decreasing gamma-aminobutyric acid (GABA) neurotransmitter, and thus results aberrant behavior, decreased cognitive, and language development.
- Virtual autism- exposure to screen time under age 2 years can give rise to symptoms like autism. Case reports suggest complete reversal of ASD symptoms and normal development after screen time was curtailed.

- WHO infant guidelines
- No screen exposure till 1 year of age

- Autistic people may be drawn to screens because they provide a repetitive and predictable interface that is easily customised to the specific interests of an individual.
- Digital media provides the user with visual and auditory engagement that stimulates neural pathways. For many autistic children and adolescents these neural pathways are not always stimulated during face to face interactions. (Mc Mullan, 2016)
- Large study from USA found no difference in screen time between children with and without ASD, both were high (Montes, 2016)

- The **benefits** are:
  - creating learning opportunities
  - increasing knowledge
  - increasing opportunities for social contact and support.
- The **risks** include:
  - negative effects on sleep
  - problems with attention and learning
  - higher incidence of obesity and depression
  - exposure to inaccurate, inappropriate and/or unsafe content and people
  - compromised privacy and confidentiality
  - (Chassiakos et al., 2016; Westby, 2016)

# National Policy Updates

- The enactment of the *National Trust* for the Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act, 1999.
- The Trust promotes measures for the care and protection of persons with disability by appointment of guardians and trustees, facilitates realization of equal opportunities, protection of rights, and full participation of these individuals.
- The Right to Education Act, 2009 and Sarva Shiksha Abhiyan the Government of India's flagship program for achievement of universalization of education, have a mandate for inclusive education for all children with disabilities including autism and intellectual disability .

# National Policy Updates

- Another important development has been the recognition of child and adolescent psychiatry as an academic discipline. The Medical Council of India has made it mandatory for all the departments and institutes of psychiatry imparting post graduate degree (MD) in Psychiatry to have child and adolescent psychiatry services.

# National Policy Updates

- In 2010–2011, the Indian Council of Medical Research (ICMR) announced plans to conduct in-depth research in ASDs.
- Since then, several projects addressing early diagnosis and prevalence, evolution of diagnostic thresholds criteria for Indian population, standardization of multidisciplinary assessment, functional imaging studies, correlational studies with neuro-psychiatric morbidities, standardization of therapeutics, genetic studies (e.g., REELIN gene, MeCP2, b-amyloid precursor protein), biochemical markers, intervention studies and services for care, development of training modules for parents and children, development of modules of care at schools and home, special education and remediation, and speech therapy and sensory integration studies have either been launched or are in the pipeline.

Thank you

