Nltk

Nevertheless, it is now possible to establish some differentiations among risk factors that can assist in developing detection and personalized follow-up of populations at higher risk for ASD. In the case of ASD, both advanced maternal and paternal age at time of birth (?35 years) were associated with an increased risk of ASD [23?26]. Findings across several meta-analyses examining the association between antidepre exposure during pregnancy and ASD are reasonably consistent showing an increased risk .

SpaCy

Next-generation sequencing (NGS) methods revolutionized ASD gene discovery and have also substantially contributed to functional genetic data, linking mutations frequently associated with ASD with genes involved in the regulation of brain transcriptional networks during brain development and early synaptogenesis, thus throwing some light on the understanding of the neurobiological consequences of the disruption of these ASD-associated genes Medications: A growing number of researches highlighted the potential association of prenatal exposure to Selective Serotonin Reuptake Inhibitors (SSRIs) with the onset of ASD, hypothesizing a pathogenetic link between alterations in serotonin pathways and ASD neurobiological abnormalities [54?56]; exposure during the preconception period or the first trimester seems to be associated with a higher risk compared to the other two

trimesters [57]. More recently, some population-based cohort studies described a potential link between autism risk and maternal infection or inflammation during pregnancy, depending on the time of gestational exposure, the type of infective agent, and the intensity of the maternal immune response; specifically, viral infections seem to be associated to ASD risk in the first trimester, bacterial infections in the second trimester, influenza and febrile episodes during the whole pregnancy but especially in the third trimester

summary_bert

Autism Spectrum Disorder (ASD) is a complex condition with early childhood onset, characterized by a set of common behavioral features. Several environmental factors have been discussed in terms of ASD risk, namely advanced parental age, assisted reproductive technologies, nutritional factors, maternal infections and diseases, enviro chemicals and toxicants, and medications, as well as some other conditions. While the etiology of ASD is not fully understood, genetics is a well-established risk factor [8]. While progress has been made towards gaining an understanding of genetic and epigenetic factors, environmental risk factors are less understood [18]. Actually, recent studies have demonstrated that during critical periods of central nervous system development, early exposure to a variety of environmental factors, ranging from microbes (bacteria and viruses) to medications, from chemicals to

physical agents, can affect neurobiological development, including effects relevant to ASD [19,20]. In October 2018, international ASD experts convened in Rome to discuss the potential pathogenetic role of environmental factors, as well as their interactions with genetic susceptibility, focusing on three biologically relevant windows for brain development: the periconception, prenatal and early postnatal periods.

Actually, assisted conception and ASD share several risk factors. In both cases, hormonal disturbances, especially in testosterone/androgen regulation along with high rates of advanced parental ages, preterm deliveries, and LBW, have been reported [6,24,36,37]. Conversely, some apparently conflicting results were reported by other studies that related an increased risk for ASD and neurocognitive impairments in children of mothers who used dietary supplements of synthetic FA [47?49]. A possible explanation of these diverging results might be offered by the different compositions between the FA used in supplements (pteroylmonoglutamic) and the one from natural food sources (ormyl-tetrahydropteroylglutamates). High levels of pteroyl acid, which depend on liver-based metabolism, could result in high levels of unmetabolized and non-useful FA in the blood, which can cause changes in brain synaptic transmission and dysregulation of expression of many genes associated with ASD [50?52]. The importance of a correct intake of iron is evident already from the peri-conception period [53]. In the brain, iron contributes to neurotransmitter production, myelination and immune function. Thus, some diverging results have been found in relation to both antidepressant types and dosages

[58,59]. Furthermore, a Danish longitudinal study, with a follow-up of 5,057,282 person-years, did not detect a significant association between maternal use of SSRIs during pregnancy and ASD in the offspring [60]. The widely used pyrethroids have been associated to ASD and neurodevelopmental delay [83]. Phthalates: Phthalates are a class of chemicals used as plasticizers, solvents, and lubricants, and as enteric coatings on pharmaceuticals and nutritional supplements. Among antiepileptic drugs (AED), valproate showed the strongest association with neurodevelopmental outcome, in terms of cognitive disabilities, developmental delay, and ASD [86]. On the other hand, association between moderate alcohol intake in pregnancy and ASD is unlikely [94]. Therefore, at present, insufficient data have been found to support an association. Specifically, low concentrations of vitamin D and FA are associated with an increased risk of ASD diagnosis, in particular if these deficiencies are present in the mid-gestational period [100,101]. Prenatal infections and maternal immune activation: Current data suggest that at least for a subset of women, exposure to infections during pregnancy might increase ASD risk or other disorders of the central nervous system (CNS) in the offspring. Activation of the maternal immune response can confer a risk for the onset of psychiatric disorders. These studies, however, have generated conflicting results [56,105]. Whether control of diabetes reduces ASD risk is still unknown [114,115]. Additionally, maternal melatonin levels have been investigated as potential culprits in the ASD pathogenesis [119]. Melatonin

deficiency is frequently detected in ASD children already in a very early period of life, and thus the potential implications of low maternal melatonin levels have been considered as a factor that might increase the susceptibility to autism [120].