Neuro-Developmental Research on the Etiology of Amblyopia and its Management, (Neuro-DREAM)

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Amblyopia, also called „lazy eye", is a disorder causing impaired vision in millions of infants and young children worldwide. It occurs in around 3.5% of the population and is therefore of great clinical and societal importance. Despite its common name „lazy eye" it is not really an eye disorder but a disorder of the visual cortex, the part of the brain that processes visual information. Amblyopia leads to poor vision in one eye that appears otherwise normal. Unfortunately, the causes of this disorder are not fully understood and current treatments are ineffective in a large number of patients. The most common treatment is to patch the unaffected or non-amblyopic eye, forcing the brain to use and train the affected eye. However, such treatment usually leads to poor coordination of the two eyes. Precise coordination of the two eyes is essential for accurate depth perception, which is strictly required for many occupations including aviation, shipping, the police, surgeons, or operators of heavy duty equipment as well as sports and leisure activities. Thus children suffering from amblyopia are severely disadvantaged in many aspects of their lives. Recent empirical and theoretical research from our team has highlighted the importance of binocular interactions in the development of normal vision and strongly suggests that different treatment methods could lead to greatly improved intervention outcomes in children and adults. To further address this issue, our project aims to improve our understanding of the basic brain mechanisms underlying amblyopia and its treatment, develop novel treatment approaches for children and adults based on this improved understanding, and directly compare the effectiveness of different treatments. Neuro-DREAM has the potential to revolutionize the way we treat amblyopia, improving vision and quality-of-life in millions of patients — truly a DREAM come true for all affected families.