Abstract: Progressive brain damage is undoubtedly the main cause of clinical symptoms of dementia in neurodegenerative disorders such as Alzheimer's disease. However, the association between brain damage and cognitive symptoms is not linear. Certain interindividual differences such as a good school education or a greater brain volume are associated with a higher resilience against brain damage that is usually referred to as cognitive reserve (CR). Individuals with high CR have a diminished risk for dementia and both active and passive concepts for this phenomenon are discussed. In the concept of passive CR, peculiarities of brain structure such as higher synapse or neuron counts are regarded as buffers against brain damage. Symptoms of dementia do not occur until a certain threshold of damage is passed. In addition to the passive concepts, active mechanisms are also discussed that are associated with the ability to maintain a certain level of cognitive performance in the face of progressive neurodegeneration for a longer period. In subjects with healthy cognitive function, these active mechanisms contribute to the adaptation of brain activity when task difficulty level is increased. Confronted with progressive neurodegeneration, these active mechanisms help to compensate for brain damage. Individuals with higher CR show more efficient activation for solving the same task, which helps them to...
preserve normal levels of cognitive performance for a longer period.