The BrainTrain consortium was a collaboration between eight leading EU research institutes (Amsterdam, Heidelberg, Leuven, London, Magdeburg, Paris, Stockholm, and Trieste) the RIKEN (Yokohama), five commercial partners (Sylics BV, Beactica AB, BiObserve GmbH, Leloux, Science & Business BV, and Sygnis Pharma AG) and the Federation of European Neuroscience Societies (FENS).

The BrainTrain Network was based on an integrative approach in neuroscience. The BrainTrain research program had four research teams each formed by three students and one research team of five students. Each research team had its own research focus and unique methodology. Together, all research teams performed human and/or mouse studies and selected two classes, major depressive disorder and neurodegenerative diseases (dementia and Parkinson's disease) as their main disease topic. A key feature of the BrainTrain project was the exchange of knowledge and expertise as well as the variety of workshops, courses and conferences organized by the BrainTrain consortium and their individual partners for all ESRs throughout the funding period. These courses, held in all involved institutes, provided ample opportunities to acquire information on the overall method spectrum used for integrative ideas and exchange. In the first year the annual meeting was held in Amsterdam, where students and supervisors learned to know each other. The second annual meeting followed a year later in Uppsala, where all ESRs presented the progress of their scientific projects to all supervisors, the ombudswoman and the REA representative for the European Commission. The third annual meeting was held in Trieste and this meeting was also used by the students to start planning the final assignment to organise a conference in Japan a year later. In the final year (2013) all ESRs joined at RIKEN (Yokohama, Japan) for their final course and thereafter gathered for the final meeting to present and discuss the status of their work and plan for the finalization of their PhD projects and for the conference they organised themselves with external keynote speakers.

Results per team:
- Research team 1 'Genetics of the brain' discovered a large number of new genes and transcripts from human postmortem brain samples of mutation carriers for Frontal Temporal Dementia. These gene expression data of unprecedented depth in combination with genomic variation is important to determine the effects on genetic variation and environmental factors for genes expression in health and disease.
- Research team 2 'Synaptic Interactome' identified various novel interactors that are important for AMPA receptor trafficking, which affects neural signalling underlying cognitive and emotional functions and dysfunctions. For selected factors kinetic analyses were performed. Moreover methods to analyse ECM components were established and used in WP2 projects. The trainees successfully collaborated to obtain novel insights in the role of AMPAR- and ECM-associated proteins.
- Research team 3 'Functional Genomics of the Synapse' provided new insight in synaptic transfer functions underlying communication of nerve cells. This offers a powerful experimental scheme to identify the role of synaptic properties in shaping network activity that eventually determines behaviour including complex functions such as learning and memory. Altered synaptic properties are expected to contribute to cognitive and emotional dysfunctions underlying brain disorders.
- Research team 4 'Synaptic Plasticity' investigated information processing in neuronal circuits at many different levels from mRNA to the level of networks underlying behaviour. Using different models for impaired information processing, namely Fragile X syndrome and Alzheimer's Disease, the ESRs have focused on current and potentially new therapeutic targets in these disorders and their effects upon the surrounding networks.
- Research team 5 'Transmission and behavioural function' developed new behavioural and neurochemical tools to investigate genetic mouse models of depression and cognitive dysfunction. The ESRs used a spectrum of behavioural, autonomic and neurochemical measures for improved characterization of cognitive and emotional performance of mice. A serotonin receptor subtype was identified as target to improve cognitive function and depressive-like behaviour. These approaches will be continued in future experiments on affective disorder models and potential genetic and/or drug targets.

Taken together the ITN BrainTrain consortium has been an excellent platform to combine the multidisciplinary research aspects of the different research teams to promote collaborative research. Thereby it facilitated our knowledge to improve the understanding of mechanisms potentially contributing to emotional and cognitive disorders. The generated research results create novel opportunities for future projects and collaborations. It will further stimulate our efforts to understand brain disease mechanisms and will help by generating novel opportunities for effective treatments. For further information please check our website at www.brain-train.nl.

Students discussing the organisation of the final conference in Trieste.