Chapter 3
The Path from Obesity and Hypertension to Dementia

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Hypertension and obesity are two major risk factors for the development of vascular diseases such as coronary artery disease or stroke. Traditionally, it has been assumed that neurodegenerative disorders such as Alzheimer's disease follow different and independent pathogenetic routes towards brain damage; however, more and more evidence is being provided that hypertension and obesity also are related to the development of neurodegenerative disease. We are studying human cohorts in which these risk factors are being assessed and related to changes in brain structure and function.

Associated with obesity we find the following alterations in the brain: (1) In early stages (young subjects), the main correlate of increased BMI or leptin level is found in reward areas showing more gray matter density probably related to the "addiction" nature of obesity. (2) In elderly subjects, we find diffuse brain atrophy associated with obesity, and (3) also in elderly subjects we find diffuse changes in white matter integrity similar to the ones which are observed in aging and Alzheimer's disease. The latter influence of obesity on white matter seems more pronounced in women.

For hypertension, we find an increased rate of white matter lesions as well as signs of atrophy in anterior cingulate and surrounding areas of the prefrontal cortex. While the white matter lesions in subjects with hypertension may be related to vascular disease, all the other findings seem to be related to other pathogenetic processes. We conclude that—even in subjects who do not suffer from neurodegenerative disease (yet?) hypertension and obesity are related to brain alterations of which some are so similar to those seen in subjects with manifest neurodegenerative disorders that a common pathogenetic path seems likely.

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P. Vlamos, A. Alexiou (eds.), *GeNeDis 2014*, Advances in Experimental Medicine and Biology 821, DOI 10.1007/978-3-319-08939-3_3