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# Oskar Fischer and the drusiform necrosis

## *Oskar Fischer e a necrose drusiforme*

Eliasz Engelhardt[1] [https://orcid.org/0000-0003-4168-1992]

The present days histopathologic signature of Alzheimer's disease comprise 'senile (neuritic) plaques' (amyloid deposition, dystrophic axon terminals, activated microglia, and reactive astrocytes), and 'neurofibrillary tangles' found in presenile and senile cases.[1] These markers were identified in the beginning of the 20th century, as described below.

Alois Alzheimer (1864-1915), a German psychiatrist and neuropathologist, described 1 case of '[pre] senile dementia' (*Senile Demenz*), presented in 1906, and published as a short communication in 1907, with 'remarkable changes of the neurofibrils' (*merkwürdige Veränderungen der Neurofibrillen*) [neurofibrillary tangles] in brain cortical neurons, and mentioned briefly 'miliary nodules' (*miliare Herdchen*) [plaques], mostly abundant in the superficial brain cortical layers.[2]

A brief time later, in 1910, Emil Kraepelin denominated this condition 'Alzheimer's disease'.[3]

Soon, Alzheimer presented a detailed description of plaques in a paper published in 1911, where he refers to these structures as Fischer's plaques.[4]

Oskar Fischer (1876-1942), Czech psychiatrist and neuropathologist, examined 12 'senile dementia' (*Senile Demenz, Presbyophrenia*) cases, where he noted foci of cortical 'drusiform necrosis' (later 'multiple cerebral filamentous spheroids') (*drusige Nekrose* [later *Sphaerotrichia cerebri multiplex*]) [neuritic plaques], the main focus of his studies at the time, described in a paper published in 1907.[5] He confirmed these findings in a paper published in 1910 on 56 presenile and senile dementia cases. (Figure) He also described 'coarse fibrillary proliferation of the ganglion cells' (*grobfaserige Fibrillenwucherung der Ganglienzellen*) [neurofibrillary tangles], in a subset of 10 cases with plaques.[6]

Further studies clarified progressively the pathology of this kind of dementing condition.[1,7]

There is no doubt that Alzheimer deserves to be celebrated for his findings. However, Fischer should not be forgotten, considering that in present days, the plaques (neuritic plaques), which formation he described in great detail, are focus of the new therapeutic approaches for Alzheimer disease.[8]

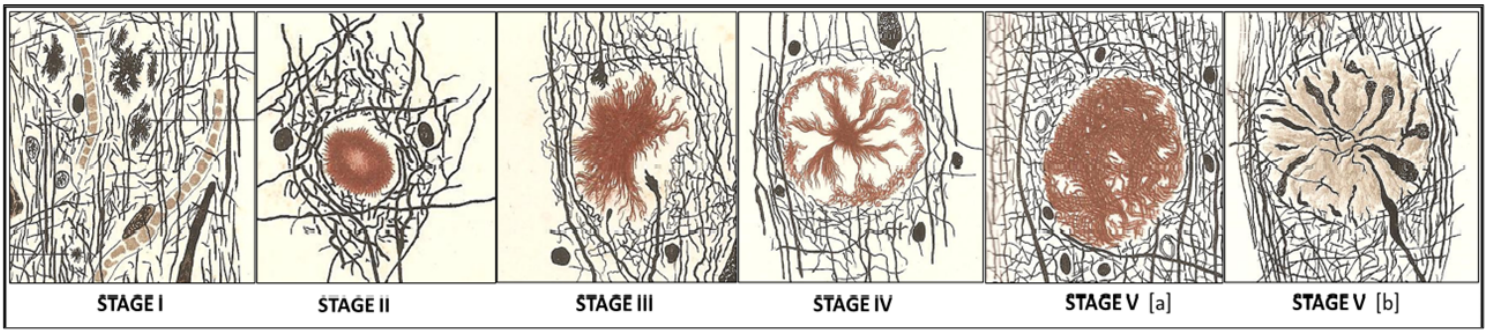


**Figure.** Plaque staging regarded by Fischer as developmental steps of a degenerative process.[5,6]
According to Fischer, the plaque stages I–V formed a continuum covering from early to late clinical phases:
**Stage I** = 'little star-like formation' (*Sternschenbildung*) - the smallest structure, with filaments arranged as irregular star-forms; absence of bulbous growths of axon terminals; it is plaque's initial stage; over time, several of these structures merge to form the next stage [VII-1 (1000x)]
**Stage II** = 'morningstar formation' (*Morgensternformation*) constituted by merged little star-like structures - absence of 'bulbous growths of axon terminals' [dystrophic neurites] [VII-3 (1000x)]
**Stage III** = 'spoke formation' (*Speichenbildung*): development of a court [core] (*Hof*), with presence of abnormal material outside the morning stars, giving rise to a spoke-like appearance; rare presence of 'bulbous growths of axon terminals' [dystrophic neurites] [VII-5 (1400x)]
**Stage IV** = 'wheel-like formation' (*Rädchenbildung*) with a star-like core linked to a fibrous sphere through several spokes: less frequent presence of 'bulbous growths of axon terminals' [dystrophic neurites] than in the next stage [VIII-7 (1400x)]
**Stage V**[a] = 'large druse' - large plaque with a homogeneous appearance; without bulbous growths of axon terminals [X-16 (350x)]
**Stage V**[b] = 'thick fibrous tangles' (*diekfaserigen Knäuls*) constituted by thick fibrous material, and making up a large plaque with a homogeneous appearance; frequent presence of bulbous growths of axon terminals [dystrophic neurites] [XII-27]

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[1]Instituto de Neurologia Deolindo Couto and Instituto de Psiquiatria, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

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**Corresponding author address:** eliasz@centroin.net.br