

Unlocking the Mysteries of Neurodegenerative Diseases: Advances in Research, Diagnosis, and Treatment



SYLLABUS

VU Amsterdam Summer School

July 6 – July 17 2026

Any general questions for the Summer School support team? Contact amsterdamsummerschool@vu.nl.



Course Details

Title	Unlocking the Mysteries of Neurodegenerative Diseases: Advances in Research, Diagnosis, and Treatment	
Coordinator(s)	Dr. Willem de Haan, Dr. Femke Feringa, Dr. Kim de Kleijn	
Other lecturers	Dr. Sven van der Lee, Dr. Dareia Roos, Dr. Lisa Waterink, Dr. Inge Verberk, Dr. Ruud Wijdeven, Drs. Daphne Nijland, Drs. Leo Pieperhoff, Dr. Floor Duits, Dr. Casper de Boer, Dr. Willem de Haan, Dr. Femke Feringa, Prof. Ronald van Kesteren, Dr. Claudia Persoon, Dr. Kim de Kleijn, Dr. Truus Abbink, Dr. Sanne Vermorgen, Em. Prof. Philip Scheltens	
Form(s) of tuition	Lectures, tour in the Alzheimer Center (Amsterdam UMC), iPSC lab tour, debate, group presentation	On campus,
Approximate contact hours	60	
Approximate self-study hours	10	

Teaching staff (in order of appearance)

Dr. Willem de Haan, Dr. Kim de Kleijn, Dr. Femke Feringa, Dr. Sven van der Lee, Dr. Dareia Roos, Dr. Lisa Waterink, Dr. Inge Verberk, Dr. Ruud Wijdeven, Drs. Daphne Nijland, Drs. Leo Pieperhoff, Dr. Floor Duits, Dr. Casper de Boer, Dr. Willem de Haan, Dr. Femke Feringa, Prof. Ronald van Kesteren, Dr. Claudia Persoon, Dr. Kim de Kleijn, Dr. Truus Abbink, Dr. Sanne Vermorgen, Em. Prof. Philip Scheltens

Course description

The course is organized by the Center for Neurogenomics and Cognitive Research (www.cncr.nl) of the Vrije Universiteit (VU) Amsterdam and the Alzheimer Center of the Amsterdam Amsterdam UMC (<https://www.alzheimercentrum.nl/>). The CNCR generates integrated research programs with state-of-the-art techniques, from genes to behavior, each combining mouse and human studies. It operates as an expertise center of the Neuroscience Campus Amsterdam. The Alzheimer Center is a world-renowned center for

dementia research and care, closely connected to other leading centers for neurodegenerative disease.

This two week-long summer school aims to provide a comprehensive, interdisciplinary understanding of neurodegenerative diseases, blending scientific rigor with practical applications. By engaging with cutting-edge research, real-world case studies and practical lab tours, participants will gain invaluable insights into the complexities of neurodegenerative diseases, preparing them to contribute meaningfully to care and research. In addition, students will obtain valuable skills in critical and constructive thinking and learn how to translate obtained knowledge and ideas into a high-quality presentation with students from various backgrounds.

Specifically the course will give the students insight into different aspects of neurodegenerative diseases of the brain such as Alzheimer's disease, Parkinson's disease and Multiple Sclerosis. Furthermore, this course will give an overview of the current treatment landscapes of neurodegenerative diseases and research progress that contributes to future exciting developments for treatment.

We aim to equip (future) health care professionals and researchers with the necessary tools to better understand and manage neurodegenerative disease. Therefore, this summer school offers a comprehensive exploration of the latest advances in research, clinical management, and care strategies. Our course aims to bridge the gap between current research and clinical practice by introducing participants to the biological (cell and animal models, microscopy, physiology), clinical (etiology, pathology, genetics, diagnosis), therapeutic and social dimensions of neurodegenerative disease.

Learning objectives

By the end of this course you will have:

- Basic knowledge on pathology, clinical presentation and disease course of various neurodegenerative diseases.
- In-depth knowledge on specific research approaches and methods to address various aspects of neurodegenerative disease.
- An overview of current limits and future needs for patients suffering from neurodegenerative diseases.
- An overview of diagnostics and therapy of neurodegenerative diseases.
- Tools to recognize the value of integration of patient care and research.
- Knowledge on how to judge research models for neurodegenerative diseases.
- Experience in presenting a neurodegenerative disease related topic to peers and experts in the field.

Assignments and Assessment

Student groups (3-4 students each) will be formed based on variation in background to facilitate interdisciplinary exchange of knowledge. Student groups then decide on a shared topic of interest (which can be more clinical or more fundamental), on which they will collect literature and prepare a PowerPoint presentation of 15 minutes for the group of students and the course coordinators (60% grading). The course coordinators will guide the student groups towards a feasible topic and high-quality presentation. In addition, the course will include a debate among the students on different models used for neurodegenerative disease research (cell vs animal models) and the amyloid hypothesis for Alzheimer's disease (40% grading). Both the student's performance in the group presentation, and their contribution to the debate will be individually graded.

The participants are expected to attend at least 90% of the course curriculum (nine out of ten days), with the debate and the presentation being obligatory. In addition, overall performance during the course will be taken into account.

The learning goals we aim to reach with our curriculum:

- Broaden knowledge on neurodegenerative diseases from various angles to generate more inclusive research and care.
- Challenge students to cooperate with other students from various backgrounds on a shared topic.
- Translate literature on a topic into a coherent high-quality scientific presentation.
- Develop an opinion about conduction of research and hypotheses within the field.
- Formulate an own area of interest within the field of neurodegenerative disease for future internships, studies or job interviews.

Provisional reading list

Scheltens, P., De Strooper, B., Kivipelto, M., Holstege, H., Chételat, G., Teunissen, C. E., ... & van der Flier, W. M. (2021). Alzheimer's disease. *The Lancet*, 397(10284), 1577-1590. DOI: [10.1016/S0140-6736\(20\)32205-4](https://doi.org/10.1016/S0140-6736(20)32205-4)

Bloem, B., Okun, M.S., & Klein, C. (2021). Parkinson's disease. *The Lancet*, 397(10291), 2284-2303. DOI: [10.1016/S0140-6736\(21\)00218-X](https://doi.org/10.1016/S0140-6736(21)00218-X)

Jamikovski, D., Bittner, S., Zivanidov, R., Morrow, S. A., Benedict, R. H. B., Zipp, F., & Weinstock-Guttman, B. (2024). Multiple sclerosis. *The Lancet*, 403(10422), 183-202. DOI: [10.1016/S0140-6736\(23\)01473-3](https://doi.org/10.1016/S0140-6736(23)01473-3)

Van Der Flier, W. M., & Scheltens, P. (2018). Amsterdam dementia cohort: performing research to optimize care. *Journal of Alzheimer's Disease*, 62(3), 1091-1111. DOI: [10.3233/JAD-170850](https://doi.org/10.3233/JAD-170850)

Van der Knaap, M. S., Schiffmann, R., Mochel, F., & Wolf, N. I. (2019). Diagnosis, prognosis, and treatment of leukodystrophies. *The Lancet Neurology*, 18(10), 962-972. DOI: [10.1016/S1474-4422\(19\)30143-7](https://doi.org/10.1016/S1474-4422(19)30143-7)

Course Schedule

Monday July 6th: 10 am – 15 pm.

Tuesday July 7th: 9 am – 17 pm

Wednesday July 8th: 9 am – 12.30 pm

Thursday July 9th: 9 am – 17 pm

Friday July 10th: 9.30 am – 17 pm

Monday July 13th: 9.30 am – 17 pm

Tuesday July 14th: 9 am – 17 pm

Wednesday July 15th: 9 am – 12.30 pm

Thursday July 16th: 9 am – 16 pm

Friday July 17th: 9 am – 15 pm

