The Ins & Outs of Kidneys: From Physiomics to Transplantation

Course programme

6 – 10 July 2020
Contents

Course overview .............................................................................................................................................. 3
Course description ...................................................................................................................................... 3
Learning outcomes ...................................................................................................................................... 3
Level of participant ..................................................................................................................................... 4
For whom is the course designed ............................................................................................................... 4
Admission requirements ............................................................................................................................. 4
Admission documents ................................................................................................................................. 4
Date ............................................................................................................................................................. 4
Course Fee ................................................................................................................................................... 4
Reduced Fee ................................................................................................................................................ 4
Application Deadline ................................................................................................................................... 4
Application Form ......................................................................................................................................... 4
Course leaders ............................................................................................................................................. 5
Lecturers ..................................................................................................................................................... 5
Certificate ........................................................................................................................................................ 7
ECTS credits ..................................................................................................................................................... 7
Study load ........................................................................................................................................................ 7
Course organisation ........................................................................................................................................ 7
Brightspace ...................................................................................................................................................... 7
Literature ......................................................................................................................................................... 8
Assignments .................................................................................................................................................... 8
Assessment ..................................................................................................................................................... 8
Overall schedule Radboud Summer School .................................................................................................... 9
Preliminary day-to-day programme .............................................................................................................. 10
Contact details............................................................................................................................................... 12
Course overview

Course description
In the 1960s, people with kidney failure had little hope of survival. Dialysis was considered an extraordinary treatment and restricted to very few. Transplantation was still experimental. The rise in incidence of patients with chronic kidney disease worldwide, most probably reflecting the global epidemic of type 2 diabetes and the ageing of the populations in developed countries, is seen as a major health burden. Over the last decades, the technical level of research is much higher and the field of renal research uses exciting state-of-the-art methods to uncover new mechanisms in renal physiology and pathophysiology. For example, the identification of the genes and mutations involved in a variety of human kidney diseases has participated in the growth of knowledge and the appearance of new fields of renal research, podocyte biology, ciliopathies, and cystic diseases, as well as the role of the kidney in blood pressure regulation. New insights in renal research has also led to a new approach to treating kidney diseases and the renal complications of diabetes. Advances in surgical techniques and immunosupression have made kidney transplantation a more cost-effective alternative to dialysis. At the RadboudUMC, a close collaboration between renal researchers and nephrologists provides (bio)medical students interested in nephrology and renal physiology additional opportunities for research training.

This summer school course on the ins and outs of kidneys: from physiomics to transplantation will be organized around renal research in general and the actual research in Nijmegen in particular, examining all aspects of kidney function. Topics include: water homeostasis, salt homeostasis and secretion, acid/base homeostasis, glomerular function, dialysis and transplantation, acute kidney failure, chronic kidney disease, diabetic nephropathy, polycystic kidney failure and a number of syndromes related to renal channelopathies.

During the course you will take part in interactive lectures about each topic, combined with practicals on modern molecular techniques. You will be provided with hands-on demonstration at research labs and will be able to visit a modern renal dialysis unit at the hospital. After completing this course, you should have gained a basic understanding of renal research, be able to understand the molecular techniques behind renal research and apply the principles of renal mechanisms to the understanding and treatment of kidney diseases.

Learning outcomes
After this course you are able to:

1. Understand renal physiology in depth
2. Understand molecular techniques employed in renal research and interpret experimental results
3. Interpret the latest insights in nephrology, hypertension, dialysis and transplantation
4. Explain the mechanisms behind kidney disorders, hypertension and channelopathies
Level of participant
- Master
- PhD
- Post-doc

For whom is the course designed
This course is designed for master students (in medicine, biomedical sciences, biology or related disciplines) and for aspiring and early stage PhD students as well as post-docs who are currently working or are planning to start working in the field of renal research.

Admission requirements
Participants should have a background in medicine, biomedical sciences, biology or related disciplines. We expect basic knowledge of renal physiology and basic skills in interpreting and running experiments in the field of renal research.

Admission documents
None

Date
6 – 10 July 2020

Course Fee
€500
The fee includes the registration fees, course materials, access to library and IT facilities, coffee/tea, lunch, and a number of social activities.

Reduced Fee
€425 for students and PhDs from partner universities and Radboud University (15% partner discount)

Early bird deadline 1 March 2020:
€450 early bird (10%)
€375 early bird + partner/RU discount (25%)

Application Deadline
1 May 2020

Application Form
www.ru.nl/summerschoolapplication
Course leaders

Jojanneke Huck, Ph.D.
Lecturer
Physiology
Radboud University Nijmegen

Jojanneke Huck has a PhD in medicine from the VU University Medical Centre. She has a strong background in biological sciences and has used many techniques working as a neuroscientist in several laboratories and medical centres in Oxford, Heidelberg and Berlin. Huck teaches kidney physiology at the Radboud university medical centre.

Joost Hoenderop
Professor
Physiology
Radboud University Nijmegen

Joost Hoenderop's background is in renal physiology and he obtained his Ph.D. degree in Medical Science at the University of Nijmegen. His current work focuses on the regulation of the mineral balance and elucidation of the molecular mechanisms underlying epithelial transport disorders in the kidney. Hoenderop is chairman of the theme "Renal disorders" that is part of the research themes of the Radboud university medical center in which kidney research in Nijmegen is embedded.

Lecturers

Dr. Jeroen de Baaij
Dept. of Physiology
Jeroen.deBaaij@radboudumc.nl

Dr. Jan van den Brand
Dept. of Nephrology
Jan.vandenbrand@radboudumc.nl

Dr. Henry Dijkman
Dept. of Pathology
Henry.dijkman@radboudumc.nl
Certificate

You will be awarded a certificate of attendance for actively participating and successfully completing all assignments. The certificate will state the amount of ECTS credits earned.

ECTS credits

Student workload at Dutch universities is expressed in ECTS credits. ECTS stands for European Credit Transfer and Accumulation System, a system widely used throughout the European Union. In the Netherlands, each ECTS credit represents 28 hours of work. We would like to point out that recognition of credits is at the discretion of your home institution. For this course you can earn 2 ECTS credits.

Study load

- Class attendance: 36 hours
- Assignment(s): 4,5 hours
- Presentation(s): 4,5 hours
- Other: 11 hours

Total: 56 hours

Course organisation

This course makes use of a wide variety of instruction media: lectures, group work using course literature, the Bright Space website and background literature, and last but not least, assignment and tours.

Different people have different preferences and abilities, and by offering many forms for transferring knowledge we hope to address as many students as possible. An active participation is required and ensures the best results. Students work in small groups; in this way, they can help each other and learn from each other’s strengths.

Brightspace

During Radboud Summer School, you will have access to our online learning environment Brightspace. One month before the summer course starts you will receive more information about Brightspace and how to access it. In your online course you will find the schedule and course related documents and or reading materials.
**Literature**

Recommended reading:
- Human Physiology, Boron & Boulpaep, 3rd edition, 2016;
- The Kidney, Seldin & Giebisch, 5th edition, 2012;

**Assignments**

The Challenge: A case will be presented related to: Glomerular diseases, Tubular disorders, Ciliopathies or Renal replacement therapies. Work as a team in groups of 5-6 participants to study one challenging medical case and give a detailed presentation on the last day of the course.

Group assignment Glomerular Diseases: Interpretation and evaluation electron microscopic images of patients with different glomerular diseases.

Group assignment Ciliopathies: Interpretation and evaluation of clinical and NGS sequencing data of patients with different renal ciliopathies (Case review, whole exome sequencing data filtering, short internet search and concise presentation of results to the other groups).

Assignments Biomarkers study: analyze and interpret a clinical epidemiological study to evaluate the predictive performance of a possible diagnostic or prognostic biomarker in kidney disease.

**Assessment**

During the course, group assignments will be carried out. There will be no separate exam. Students will not receive a grade, the course is assessed on a pass/fail basis.
Radboud Summer School is more than an academic event, it also provides you with a unique opportunity to meet other international students and to broaden your horizon. Our participants come from all over the world and all have a different cultural and academic background. More than 800 participants from 75 different countries joined us in 2019. The summer school organization has carefully selected various social activities to bring you in contact with each other and to introduce you to the beautiful city of Nijmegen.

You can sign up for the social events in the online application form. You can find an overview of the social events on our website.
**Preliminary day-to-day programme**

**Monday**

08.45-09.00  Welcome (Aula)  
09.00-11.00  Opening Ceremony (Aula)  
11.00-11.30  Ins and Outs – J. Hoenderop - Lecture: Welcome to course/introduction  
11.30-12.00  Lunch  
12.00-13.00  Visit Anatomical Museum  
13.00-14.30  Challenge outline – J. Huck  
14.30-15.30  International keynote speaker  
15.30-17.00  Challenge preparation

**Tuesday**

08.45-09.30  Glomerular diseases – B. Smeets - Lecture: Clinical presentation and pathology  
09.30-10.30  Glomerular diseases – H. Dijkman - Lecture: From diseased kidney to diagnosis  
10.30-11.00  Coffee & Tea  
11.00-12.30  Glomerular diseases – B. Smeets - PR: Interpretation and evaluation of (electron-) microscopic images of patients  
12.30-13.30  Lunch  
13.30-14.30  Glomerular diseases – B. Smeets - Lecture: Glomerular disease research  
14.30-15.30  Prepare challenge and Coffee & Tea  
15.30-16.15  Tubular disorders – J. de Baaij - Lecture: Guided tour along the nephron  
16.15-17.00  Tubular disorders – J. Hoenderop - Lecture: Tubulopathies

**Wednesday**

08.30-10.30  Tubular disorders – J. van der Wijst - Physiology – hands-on rotation  
10.30-11.00  Coffee & Tea  
11.00-12.30  Prepare challenge  
12.30-13.30  Lunch  
14.30-15.30  Ciliopathies – I. Lamers  
15.30-16.00  Coffee & Tea  
16.00-17.30  Ciliopathies – I. Lamers - Group assignment: Interpretation and evaluation of clinical and NGS sequencing data of patients with different renal ciliopathies
Thursday

08.30-10.00  Ciliopathies – I. Lamers - Presentation of results group assignment to the other groups
10.00-11.00  Prepare challenge & Coffee & Tea
11.00-12.00  Replacements – L. Hilbrands - Lecture: Renal replacement therapy: state of the art and current challenges
12.00-13.00  Lunch
13.00-14.00  Replacements – L. Hilbrands - Case: Renal transplant
14.00-15.00  Replacements – J. Jansen - Lecture: Renal replacement therapies; stem cells meet biomaterials
15.00-15.30  Coffee & Tea
15.30-16.30  Replacements – L. Hilbrands - Tour 1: Radboud Dialysis center
16.30-17.30  Replacements – J. Jansen - Tour 2: A view in the lab: Department Pathology
18.00-21.30  Walking to dinner (Restaurant Beau)
   Group photo moment for all participants “Ins and Outs of Kidneys”

Friday

08.30-09.00  Tutorial Biomarkers – J. van den Brand - Assignment 1: What is a biomarker?
09.00-09.30  Tutorial Biomarkers – J. van den Brand - Assignment 2: Epidemiologic study design
09.30-10.00  Tutorial Biomarkers – J. van den Brand - Lecture: Predictive performance measures
10.00-10.30  Tutorial Biomarkers – J. van den Brand - Assignment 3: Creating a multivariate prediction
10.30-11.00  Coffee & Tea
11.00-11.30  Tutorial Biomarkers – J. van den Brand - Assignment 3: Creating a multivariate prediction
11.30-12.00  Tutorial Biomarkers – J. van den Brand - Assignment 4: A manual on prediction modeling
12.00-13.00  Lunch /Hand in bikes
13.00-15.30  Challenge Presentations – J. Huck
   Coffee & Tea
16.00-18.00  Certificate Ceremony and Farewell Reception (Aula)
Contact details

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