

**Summer school 2024**

**Towards Immunotherapy for  
Medulloblastoma**

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## Coordinator:

Prof. Dr. N. Bovenschen  
UMCU Department of Pathology  
Heidelberglaan 100  
3584 CX Utrecht  
Tel: 088-7553889  
Secretary: 088-7556565 (Ms E. Post)  
E-mail: [n.bovenschen@umcutrecht.nl](mailto:n.bovenschen@umcutrecht.nl)  
E-mail (secr.): [e.t.m.post@umcutrecht.nl](mailto:e.t.m.post@umcutrecht.nl)

## Staff:

Prof. Dr. N. Bovenschen	Pathology-UMCU	<a href="mailto:n.bovenschen@umcutrecht.nl">n.bovenschen@umcutrecht.nl</a>
Dr. T. ten Broeke	Pathology-UMCU	<a href="mailto:A.G.tenBroeke-2@umcutrecht.nl">A.G.tenBroeke-2@umcutrecht.nl</a> (+31)0648114432
Dr. S. Crnko	Pathology-UMCU	<a href="mailto:s.crnko@umcutrecht.nl">s.crnko@umcutrecht.nl</a>
Dr. T. Koorman	Pathology-UMCU	<a href="mailto:t.koorman@umcutrecht.nl">t.koorman@umcutrecht.nl</a>
E. Pijnappel	Pathology-UMCU	<a href="mailto:E.W.Pijnappel-2@umcutrecht.nl">E.W.Pijnappel-2@umcutrecht.nl</a> (+31)0610425310
J. Meeldijk	Pathology-UMCU / CTI	<a href="mailto:J.Meeldijk@umcutrecht.nl">J.Meeldijk@umcutrecht.nl</a>
Heggert Rebel	Pathology-UMCU	<a href="mailto:H.G.Rebel-2@umcutrecht.nl">H.G.Rebel-2@umcutrecht.nl</a> (+31)0621662550
M. Schakelaar	Pathology-UMCU	<a href="mailto:M.Y.Schakelaar-5@umcutrecht.nl">M.Y.Schakelaar-5@umcutrecht.nl</a>
M. Monnikhof	Pathology-UMCU	<a href="mailto:M.Monnikhof@umcutrecht.nl">M.Monnikhof@umcutrecht.nl</a>

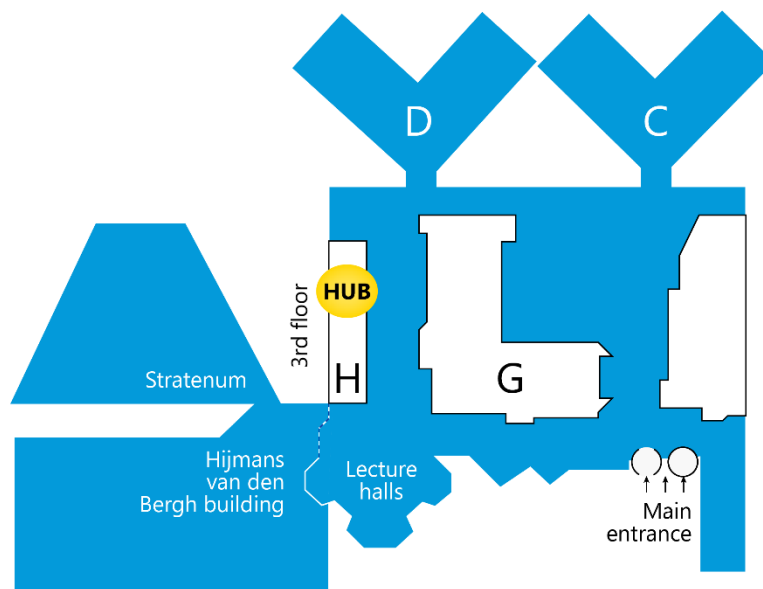
## Preface

Welcome to the Bachelor Research Hub Summer school, taking place in the newly equipped laboratory positioned in the heart of the University Medical Centre Utrecht. During the 2-week period you will be performing an authentic and real-world actual research under supervision of professionally trained teacher-researchers. You will experience a “crash-course” in the scientific world: from thinking about the topic, investigating the current literature, and writing a short project proposal, to conducting the experimental part of the research, and finally presenting and discussing your data. Sharing your findings and knowledge is always an important part of the research, therefore it is useful to get acquainted with it and practice it at the very start of your scientific careers.

The topic of the Summer school will revolve around medulloblastoma – one of the most common brain tumours in children. Currently, there are three therapeutical options for medulloblastoma: surgery, radiation and chemotherapy. Although survival rates vary from 70-85%, the quality of life of the patients is severely affected. Thus, there is a need for improved or new therapies. In recent years, immunotherapies have proven to be successful strategies in the treatment of cancer. During the course, you will investigate options for using immunotherapy as a future treatment for this disease by incorporating your own ideas and choosing your own research paths. For more information on our Summer School, check this video:

<https://www.youtube.com/watch?v=2IXnG5-dIUo>

We wish to welcome you to our laboratory where, with a support of many supervisors, you can get a glimpse of the real scientific world. Happy researching!



*Location: Bachelor Research Hub (H03.201), UMC Utrecht (Heidelberglaan 100, 3584 CX Utrecht)*

With kind regards,

Niels Bovenschen, Toine ten Broeke, Sandra Crnko, Thijs Koorman, Emma Pijnappel, Michael Schakelaar, Matthijs Monnikhof, Jan Meeldijk and Heggert Rebel

## Literature

The following articles and videos will give you an insight into the topic and techniques you will be using during the Summer school.

### 1. Medulloblastoma

Paul A. Northcott, Giles W. Robinson, Christian P. Kratz, Donald J. Mabbott, Scott L. Pomeroy, Steven C. Clifford, Stefan Rutkowski, David W. Ellison, David Malkin, Michael D. Taylor, Amar Gajjar & Stefan M. Pfister

*Nature Reviews Disease Primers* volume 5, Article number: 11 (2019)

<https://www.nature.com/articles/s41572-019-0063-6>

### 2. The blockade of immune checkpoints in cancer immunotherapy

Drew M. Pardoll

*Nature Reviews Cancer* volume 12, pages 252–264 (2012)

<https://www.nature.com/articles/nrc3239>

### 3. Immunotherapy in medulloblastoma: Current State of Research, Challenges, and Future Perspectives

Marije J. Voskamp, Shuang Li, Kim R. van Daalen, Sandra Crnko, Toine Ten Broeke, Niels Bovenschen

*Cancers* 13(21):5387 (2021)

<https://pubmed.ncbi.nlm.nih.gov/34771550/>

### 4. Bachelor Research Hub

<https://www.youtube.com/watch?v=PmBeLLvpXHw>

<https://www.bachelorresearchhub.com/>

### 5. Western blot tutorial

<https://www.youtube.com/watch?v=CEEekahiqMo>

### 6. Cell culture tutorial

<https://www.thermofisher.com/nl/en/home/references/gibco-cell-culture-basics/introduction-to-cell-culture.html>

### 7. Flow cytometry tutorial

<https://www.youtube.com/watch?v=sfWWxFBltpQ>

## Schedule

### Week July 8<sup>th</sup>-July 12<sup>th</sup>:

#### Monday:

- |                                                      |              |               |
|------------------------------------------------------|--------------|---------------|
| 1. Gathering at the main entrance of UMC Utrecht     | 08:55-09:00h | Everyone      |
| 2. Introduction to the Summer school                 | 09:00-09:15h | N. Bovenschen |
| 3. Introduction of the topic                         | 09:15-10:00h | N. Bovenschen |
| 4. Hypothesis formulation, planning and preparations | 10:15-17:00h | Students      |

#### Tuesday:

- |                                                      |              |               |
|------------------------------------------------------|--------------|---------------|
| 1. Lab journal                                       | 09:00-09:30h | T. ten Broeke |
| 2. Discussion of the hypothesis and planned lab work | 09:30-10:00h | Everyone      |
| 3. Lab work*                                         | 10:15-17:00h | Students      |

#### Wednesday:

- |             |              |          |
|-------------|--------------|----------|
| 1. Lab work | 09:00-17:00h | Students |
|-------------|--------------|----------|

#### Thursday:

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|-------------|--------------|----------|
| 1. Lab work | 09:00-17:00h | Students |
|-------------|--------------|----------|

#### Friday:

- |                                                           |              |          |
|-----------------------------------------------------------|--------------|----------|
| 1. Recap results (short ppt) + Planning for the next week | 09:00-09:45h | Everyone |
| 2. Lunch walk in the Botanical garden UU                  | 12:00-13:00  | Everyone |
| 3. Lab work                                               | 10:00-17:00h | Students |

*\*Lab work includes: molecular biology, cell culture, Western blot, Flow cytometry, etc*

**Week July 15<sup>th</sup>-19<sup>th</sup>:****Monday:**

1. Lab work*	09:00-17:00h	Students
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**Tuesday:**

1. Lab work	09:00-17:00h	Students
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**Wednesday:**

1. Lab work	09:00-17:00h	Students
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**Thursday:**

1. Lab work	09:00-17:00h	Students
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**Friday:**

1. Presentation preparation	09:00-15:00h	Students
2. Final presentation (30min+discussion)	15:00-15:45h	Students
3. Closing remarks	15:45-17:00h	N. Bovenschen

*\*Lab work includes: molecular biology, cell culture, Western blot, Flow cytometry, etc (see list of techniques on the last page of syllabus)*

## Knowledge of techniques per teacher

	Emma	Sandra	Toine	Jan	Heggert	Matthijs	Michael	Thijs
Cell culture	+++	+++	+++	+++	+++	+++	+++	+++
Western Blot	++	++	+++	+++	+++	++	+++	+++
RNA isolation, cDNA synthesis and qPCR	++	+++	+	+++	++	+	+++	+++
Flowcytometry	+/-	+/-	+++	++	++	+++	+++	+++
Cloning	-	-	++	+++	++	-	-	++
IF	+/-	+/-	+++	+	+++	-	+/-	+++
IHC	+++	++	+	+	+++	-	-	++
Transfection	++	++	++	+++	+	+	+	+++
PBMC + NK cell isolation	-	+/-	+++	+	+++	+++	+++	+++
XCELLlignce	-	+	++	?	++	-	-	-
Confocal microscopy	+	++	+++	+++	+++	+	+	+++

- = Has no knowledge of this technique

+/- = Has almost no knowledge of this technique

+ = Has a little knowledge of this technique

++ = Has a lot of knowledge of this technique, but cannot answer all questions concerning the technique

+++ = Has all the knowledge of this technique and can answer difficult questions concerning the technique



## Techniques and facilities available in or via the Hub

- Flowcytometry
  - Cytoflex (HUB)
  - BDCantoll (Flow facility)
- Immunohistochemistry
- qPCR
- Western Blot
- SEM (in collaboration with Cell Microscopy Center, Tineke Veenendaal)
- Confocal imaging
- Immunofluorescence
- Cell culture
- Transfection
- Cloning
- CRISPR-Cas
- Killing assays
- PBMC and Primary NK cell isolation from healthy donor blood
- Making of fusion proteins
- Electroporation
- XCELLigence

Chemicals can be found according to the SOPs. If not present, consult the HUB team for more information.