

## Department of Ophthalmology



Dear colleagues,

despite the corona pandemic, we don't want to withhold our annual review for 2020. Our patients experience treatment at a consistently high level despite the current conditions. We are looking forward to better times and hope you stay safe and healthy!

# Ophthalmology at the University Hospital of Cologne

The Department of Ophthalmology at the University Hospital of Cologne is one of the largest ophthalmological clinics in Europe. While maintaining excellent standards, an annual average of about 7,000 inpatients and 50,000 outpatients are treated here by a team of 40 doctors and 20 scientists in all areas of ophthalmology. Thanks to extensive subspecialization, we are able to offer the most modern diagnostic methods and therapies for our patients from Cologne, the Rhineland, Germany, Europe, and the rest of the world, while maintaining a humane and scientifically oriented way of practicing medicine 365 days of the year.

We are the only ophthalmological University Hospital in Germany which is supported by a Research Unit of the German Research Foundation (DFG) in order to discover new therapeutic approaches to thus far untreatable diseases.

We proudly look back at the more than 100-year-old history of the Department of Ophthalmology at the University Hospital of Cologne. It allows us to now successfully treat our patients through university medicine and pave the way for the future through teaching and research.

On behalf of all staff members

Univ.-Prof. Dr. Claus Cursiefen Chairman and Professor





#### Out- and Inpatient Case Numbers

For the past 100 years, the Department of Ophthalmology at the University Hospital of Cologne has been broadening its medical spectrum significantly. Outpatients as well as inpatients receive the newest conservative and surgical treatments for any kind of ophthalmological disease, pursuant to the highest standards of medicine. Due to the corona pandemic, all parameters for 2020 are reduced.



The number of actual patients seen is much higher.



2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
5328	5068	5473	6150	6438	6551	6518	6658	6483	6543	5707

### Surgery at the Department of Ophthalmology

The Department of Ophthalmology at the University Hospital of Cologne offers treatments for any kind of ophthalmological disease in five different operating rooms, equipped with highly innovative technology. Corneal disease, glaucoma, cataract, diseases of the eyelid, orbit, and the lacrimal duct, strabismological and neuro-ophthalmic issues, as well as retinal conditions, are surgically treated here. The most modern methods of lamellar corneal surgery (DMEK, DSAEK, DALK) and refractive surgery using laser (Femto-LASIK) have been incorporated in our range of surgical treatments for years.

Since obtaining a femtosecond laser in 2018, not only cataract surgery but also corneal transplantation (Femto-DALK, Femto-pKPL) is now performed using a very careful procedure.



### 11993 12107 12439 12982 13896 17004 1783

### Overview of surgeries on outpatients and inpatients in 2020

Corneal transplantations	837
Cornea and conjunctival procedures	534
Operations on the eye muscles	973
Eyelid, orbita, lacrimal duct and lacrimal gland procedures	2196
Iris, ciliary body, anterior chamber and sclera surgeries	2929
Lens surgeries	2154
Retina, choroid and vitreous body surgeries, incl. Retinal laser	4160
Intravitreal medication injection into the vitreous body	7809
Total	21592

16	2017	2018	2019	2020
37	18363	19415	23054	21592

#### Corneal transplantation

The Department of Ophthalmology has had its own cornea bank (University of Cologne Eye Bank) for more than 20 vears. Under the direction of Priv. -Doz. Dr. Sigrid Roters, donated corneal tissue is examined and prepared here following strict guidelines. Despite the pandemic, the Department of Ophthalmology performed close to 840 corneal transplantations in 2020 and is still the largest medical center for transplantations in Germany. They are performed by experienced surgeons and cornea specialists Prof. Dr. Claus Cursiefen, director of the clinic, Prof. Dr. Björn Bachmann, PD Dr. Sigrid Roters, and PD Dr. Mario Matthaei, senior physicians at the Department of Ophthalmology at the University Hospital of Cologne. More than 10% of all corneal transplantations in Germany are performed here in Cologne.

The modern practice of partial transplantation of the posterior part of the cornea to treat Fuchs endothelial dystrophy was introduced at the Department of Ophthalmology at the University Hospital of Cologne in 2011. It started out with 33 DMEK surgeries in the first year, but this number increased to almost 700 in the following years and even in 2020 660 partial transplantation were performed. The Department of Ophthalmology performed 4000 DMEK surgeries by the fourth quarter of last year.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
DMEK		33	163	231	306	431	425	482	616	689	660
DSAEK		13	25	12	17	21	24	14	7	13	19
DALK		20	28	30	30	37	40	32	53	56	49
p KPL	92	87	58	106	80	69	109	106	153	120	106
Boston Keratopro- thesis				2	8	6	5	8	6	1	3
Total transplanta- tions	92	155	280	389	442	564	603	656	835	879	837

#### **Glaucoma Surgery**

At the Department of Ophthalmology at the University Hospital of Cologne, access to the most modern medical devices makes wide-ranging diagnostic findings possible. These are consistently applied during the initial visit and annual follow-up visits, for the purpose of detecting a possible progression of the glaucoma at an early stage and treat it accordingly. Furthermore, keeping track of 24 -hour measurements of the intraocular pressure provides information that helps choosing and establishing further therapy with certainty. Under the direction of Prof. Dr. Thomas Dietlein, senior physician at the Department of Ophthalmology, time-tested surgical procedures as well as the newest micro technical surgeries (like stents and implants) are applied. Univ.-Prof. Dr. Verena Prokosch-Willing has joined the glaucoma department in October 2020. She is an internationally recognized glaucoma specialist whose clinical and scientific focus is the full spectrum of conservative and surgical glaucoma therapy.



3	2014	2015	2016	2017	2018	2019	2020
)	821	631	540	580	480	787	775
	143	166	154	128	171	192	184
	829	864	848	922	908	794	588
	829	804	848	922	908	/94	000
	34	52	22	8	5	20	10
)	546	480	412	788	960	977	1372
5	2373	2193	1976	2426	2524	2770	2929

#### Retina and Vitreous Body Surgery

Since June 2020, Univ.-Prof. Dr. Tim Krohne is the new director of the department for diseases of the retina and vitreoretinal surgery. There is a specialized team of physicians with many years of experience in surgical and drug treatment of diseases of the retina, macula and vitreous body. The complete spectrum of outpatient and inpatient procedures for the treatment of retinal diseases is covered here, including minimally invasive, suture-free retinal surgery, laser treatments of the retina and injections of drugs into the vitreous cavity. The most modern high-resolution imaging techniques are used for diagnostics.



#### Ophthalmic Oncology and Ophthalmic Plastic Surgery

Under the direction of Prof. Dr. Ludwig Heindl, all forms of benign and malignant tumors of the eyelid, orbit, conjunctiva, retina, choroid, and ciliary body are treated here in the ophthalmooncologic and ophthalmoplastic department. Since July 2020, the Department of Ophthalmology offers patients with benign and malignant tumors of the eye integrated care in cooperation with the Center for Integrated Oncology (CIO), where patients can receive interdisciplinary care including radiotherapy using Cyberknife.

Moreover, conditions of the lacrimal drainage system and orbit, as well as eyelid disorders are still treated here.



#### Strabismology and Neuro-ophthalmology

Strabismological and neuro-ophthalmological diseases are treated under the direction of Prof. Dr. Antje Neugebauer and Dr. Julia Fricke. Highly complex neuro-ophthalmic conditions as well as congenital and acquired forms of strabismus are diagnosed and treated here. With the assistance of the orthoptists and the students of the School of Orthoptics, patients with amblyopia, eye movement disturbances, or nystagmus can be treated here, among other things. Due to the pandemic, the number of elective anesthetic interventions especially in strabismology was reduced in 2020.



#### Ophthalmology with the Highest Number of Top-Physicians

In the new issue of Focus magazine's Health Physicians List 2020, the Department of Ophthalmology at the University Hospital of Cologne has, as in previous years, the most mentions of physicians among all German university eye clinics.

The following physicians are mentioned:

- > Cornea/Corneal transplantation: Univ.-Prof. Björn Bachmann, Univ.-Prof. Dr. Claus Cursiefen
- > Glaucoma: Prof. Dr. Thomas Dietlein
- > Strabismology and Neuro-ophthalmology: Dr. Julia Fricke, Prof. Dr. Antje Neugebauer

### Competence Center for Ocular GVHD - 35% increase of cases despite Covid pandemic

Despite extensive restrictions in patient care and even stricter hygiene regulations due to the covid pandemic, there was an increase in the number of cases of ocular graft-versus-host disease by 35% after the relocation of the competence center (director Prof. Dr. Ph. Steven) to the Center for Integrated Oncology (CIO). This illustrates the enormous need for targeted and competent ophthalmologic care of patients after allogeneic hematopoietic stem cell transplantation. Many patients now benefit from the proximity of the competence center to the KMT outpatient clinic, which are located only a few meters apart on level 5 of the CIO building.



### Cologne as European University Site for New Minimally Invasive Glaucoma Surgery Procedure

At the Department of Ophthalmology, the Hydrus Microshunt has now been introduced and certified with Univ. - Prof. Dr. Verena Prokosch-Willing playing an important role in the process. This makes the Cologne Eye Clinic one of two locations in the EU. As a so-called trabecular stent, the Hydrus microstent widens the physiologically existing trabecular meshwork. Based on meta-analyses, the Hydrus microstent has the best results in terms of pressure reduction. It is also recommended by the American Academy of Ophthalmology as a surgical pressure-lowering procedure with a "Strong Recommendation" - the highest recommendation to date for minimally invasive implants - in their guidelines. Since the end of March, the Department of Ophthalmology is now a certified university center for this procedure.

## Integrated Care for Patients with Tumors of the Eye at the Center for Integrated Oncology (CIO) Cologne

Since July 2020, the department for ophthalmooncology at the Department of Ophthalmology at the University Hospital of Cologne offers integrated care for patients with benign and malignant tumors of the eye at the Center for Integrated Oncology (CIO) Cologne. The CIO Cologne is certified as an oncology center by the German Cancer Society (Deutsche Krebsgesellschaft) and the department of ophthalmooncology is a nationally and internationally recognized reference center in the treatment of eye tumors of any kind. The ophthalmooncological department works in a multi-professional team consisting of oncologists, radiotherapists, radiologists, nuclear medicine specialists, surgeons, pathologists, dermatologists, maxillofacial surgeons, neurosurgeons, and ENT physicians. All physicians from these different disciplines consult with each other in interdisciplinary case conferences (tumor boards) and then develop an individual, personalized treatment concept for the respective patient based on the latest scientific findings.

In addition to the therapeutic treatment of the primary disease, the holistic approach is also reflected in the palliative medicine and psychooncological services provided to patients. Furthermore, the CIO offers counseling by the social service, nutritional counseling, complementary medical measures, the mediation of self-help groups as well as oncological exercise therapy.

### New special consultation for ocular prosthetics at the Department of Ophthalmology

To improve the quality of care for anophthalmic patients, the Department of Ophthalmology at the University Hospital of Cologne has been offering Germany's first special consultation for ocular prosthetics since January 2020. Patients with an ocular prosthesis should undergo an ophthalmological check-up at least once a year to prevent eye diseases and prosthesis-associated problems, even if there are no acute complaints. The range of services offered in the consultation includes the following:

- > Diagnosis and therapy of prosthesis-associted problems like inflammation of the orbit (e.g. Dry Anophthalmic Socket Syndrome, bacterial conjunctivitis with change of the microbiome, allergic reactions)
- > Diagnosis and therapy of aesthetic-cosmetic problems following the loss of an eye (including post-enucleation socket syndrome with volume deficiency of the orbit, malposition of the eyelids incl. blepharoptosis, entropion and ectropion)
- > Checkup of the ocular prosthesis cavity
- > Checkup of the remaining eye
- > Coordination exercise after loss of one eye
- close cooperation with ocularists and ocularistic mediation
- if necessary, psychological mediation
- > if necessary, mediation via ophthalmooncology

### Foundation of Interdisciplinary Center for Uveitis and Inflammatory Eye Diseases

An Interdisciplinary Center for Uveitis and Inflammatory Eye Diseases has been founded at the University Hospital of Cologne to care for patients with inflammatory diseases of the eye. Under Priv.-Doz. Dr. Rafael Grajewski, head of the uveitis consultation, various clinics such as pediatrics, neurology and internal medicine are interconnected. Inflammatory eye diseases are a frequent cause of visual impairment and even blindness. Many patients with uveitis also have extraocular symptoms and associations. Highly coordinated interdisciplinary care is necessary for the competent consultation of these patients.

# New research group: Neuroprotective and -regenerative treatment of glaucoma

Molecular markers in experimental glaucoma as potential key molecules for novel neuroprotective and -regenerative treatments

To find alternatives for the protection of retinal ganglion cells and their axons, research in this field has been expanded substantially. Besides intraocular pressure, age, vascular dysfunction, oxidative stress, and mitochondrial changes play a crucial role. However, clear evidence is still lacking. The new research group headed by Univ.-Prof. Dr. Verena Prokosch- Willing focuses on neuroprotective and

-regenerative treatment strategies in experimental glaucoma. The laboratory includes established in vivo and in vitro animal glaucoma models, degenerative and regenerative models, in vivo and in vitro imaging for the analysis of different retinal cells under normal conditions or in the course of the disease, a large proteomic database with interplay networks for the analysis of molecular changes under different conditions, as well as their pathway analyses.

The DFG-funded project will search for molecular biomarkers in the treatment of experimental glaucoma and their functional effects on apoptotic and regenerative signaling pathways to gain further important insights into the pathophysiology of glaucoma in order to achieve novel neuroprotective and neuroregulatory treatment strategies.

#### Foundation of the Glaucoma Imaging Center University of Cologne

The newly founded Glaucoma Imaging Center University of Cologne (GICC), headed by Priv.-Doz. Dr. Philip Enders, takes on the scientific focus of the existing research group on glaucoma morphometry. In addition to researching OCT-based glaucoma imaging, the GICC supports all areas of the eye clinic in regard to imaging glaucoma diagnostics and contributes to quality control. In a recent publication, Priv.-Doz. Dr. Philip Enders and Dr. Caroline Gietzelt from the Center for Ophthalmology showed that intraocular pressure reduction after surgery with a glaucoma drainage implant leads to a clinically significant change in nerve tissue measurement in optical coherence tomography (OCT) of the optic nerve. The increase in nerve fiber thickness does not appear to be a true improvement, but rather due to swelling of the nerve fibers. This can last for more than two years and makes clinical monitoring and reliable detection of new disease progression difficult. The group was also able to show these effects with other surgical procedures. For the high-level publication of the results after trabeculectomy, Dr. Gietzelt was awarded the 2019 Glaucoma Research Prize of the German Opthalmological Society.

#### Numerical Overview- Department of Oththalmology

Inpatient beds	70	Number of surgeries	21.592	Ophthalmologists	47
Wards	4	Number of operating rooms	5	Consultants	19
Numero f inpatients	5.707	Number of outpatients	41.573	Staff	4
Utilization	>86%	Outpatient departments			
Average length of stay (days)	3	and consultations	20		

#### Publications and impact points



#### Third party revenues



### Origin of German patients with statutory health insurance (based on referring physicians)

Α	Northrhine-Westphalia	29271
В	Rhineland Palatinate	1638
С	Lower Saxony	643
D	Hesse	262
Е	Bavaria	64
F	Baden-Württemberg	97
G	Berlin	60
н	Thuringia	46
I	Schleswig-Holstein	33
J	Hamburg	33
Κ	Saarland	19
L	Brandenburg	11
Μ	Saxony	27
Ν	Bremen	22
0	Mecklenburg Western Pomerania	8
	International patients	75
	Total	32.320

### **International Patients** (Country of Origin)

01	Netherlands	17
02	Poland	13
03	El Salvador	11
04	Switzerland	7
05	Croatia	7
06	United Kingdom and Northern Ireland	4
07	Bulgaria	3
80	Slovakia	3
09	Romania	2
10	Czech Republic	1
11	Moldova	1
12	Greece	1
13	Turkey	1
14	Cyprus	1
15	Georgia	1
16	Lithuania	1
17	Kazakhstan	1
	Total	75



#### Information for employees:

#### Awards and Prizes in 2020:

- > Univ.-Prof. Dr. med. Claus Cursiefen, general secretary of DOG (German Ophthalmological Society)
- > Univ.-Prof. Dr. med. Claus Cursiefen, Prof. Dr. med. Thomas Dietlein, Univ.-Prof. Dr. Björn Bachmann, Prof. Dr. Antje Neugebauer, Dr. med. Julia Fricke, Awarded "TOP Mediziner 2020" by the editors of FOCUS Gesundheit
- > Priv.-Doz. Dr. med. Philip Enders, Science Award by the Eye Foundation (Stiftung Auge)
- > Dr. Karina Hadrian, Sicca award
- > Dr. med. Alexander Rokohl, Antonia Howaldt, admission to CCSP (Cologne Clinician Scientist Programm)
- > Dr. Hanhan Liu, Dr. med. Alexander Rokohl, RWA award
- > Dr. med. Silvia Schrittenlocher, DFG funding of cooperative project

#### FEBO, FICO, ICO Kandidaten 2020:

- > Antonia Howaldt, Rahul Arvo Jonas, Dr. med. Verena Schöneberger, Participation in ICO (International Council of Ophthalmology) exam in the category "Optics, Refraction and Instruments"
- > Dr. med. Silvia Schrittenlocher, Participation in ICO exam in the category "Clinical Ophthalmology"
- > Volkan Tahmaz und Dr. Joel Mor, Participation in ICO exam in the category "Advance"

#### Specialist Qualificaions in 2020:

- > Dr. med. Carolin Le Blanc
- > Florian Schedler

#### New Appointments in 2020:

- > Univ.-Prof. Dr. Tim Krohne
- > Univ.- Prof. Dr. Verena Prokosch-Willing

#### New Employees:

New additions to our team of interns (assistant physicians) in the year 2020 were Dr. Jeany Li, Antonia Howaldt, Rahul Jonas, and Philomena Wawer Matos. Unfortunately, we had to say goodbye to Dr. Carolin Le Blanc, Niklas Loreck, Florian Schedler, and Priv.-Doz. Dr. Sebastian Siebelmann.

#### Habilitations since 2012

Person	Year	Title of Habilitation Thesis
PD Dr. med. Simona Schlereth	2020	The lymph- and hemangiogenic privilege of the sclera
PD. Dr. med. Sebastian Siebelmann		Non-invasive imaging for optimization ophthalmo-surgical procedures on the anterior segment
PD Dr. med. Philip Enders, FEBO, FICO	2019	Influence of the size of the optic nerve on the diagnostic accuracy of optical coherence tomography of the optic papilla in glaucoma diagnostics
PD Dr. med. Dr. nat. med. Deniz, Hos, FEBO	2019	The role of the lymphatic system in inflammatory corneal diseases
PD Dr. med. Alexandra Lappa	2018	Surgical therapy of exudative age-related macular degeneration by replacing the submacular pigment epithelium
PD Dr. med. Lebriz Altay		Risk factors for the development and progression of age-related macular degeneration
PD Dr. med. Friederike Schaub, FEBO	2018	Descemet Membrane Endothelial Keratoplasty
PD Dr. med. Mario Matthaei, FEBO	2017	Molecular studies on the pathogenesis of Fuchs endothelial dystrophy
PD Dr. med. Franziska Bucher, FEBO 20		Changes in the sub-basal nerve plexus of the cornea in ocular and systemic di- seases
PD Dr. rer. nat. Marcus Karlstetter		(Subject: Molecular Medicine) Microglial cells as a therapeutic target for dege- nerative retinal diseases
PD Dr. rer. nat. Felix Bock	2016	The role of lymphangiogenesis in rejection after corneal transplantation
PD Dr. med. Robert Hörster	2016	Experimental and clinical aspects of ocular fibrovascular scarification
PD Dr. med. Albert Caramoy	2015	Age-related macular degeneration
PD Dr. med. Tina Schick, FEBO	2015	Risk factors and prognostic factors in age-related macular degeneration
PD Dr. med. Rafael S. Grajewski		Immunoregulatory mechanisms in murine experimental autoimmune uveitis (EAU)
Prof. Dr. med. André Rosentreter	2014	Innovative concepts in glaucoma surgery
PD Dr. med. Manuel Hermann, FEBO	2013	Diagnostics and new principles in the treatment of glaucoma, age-related ma- cular degeneration and other retinal diseases
UnivProf. Dr. med. Ludwig M. Heindl	2012	The role of tumor-associated lymphangiogenesis in malignant surface tumors
Prof. Dr. med. Philipp S. Müther	2012	Pathologic ocular neovascularization

### Teaching and Training

#### Teaching:

#### Human medicine

- > Direction and exam for "Fachblock Augenheilkunde": lecture, seminar, and practical training for 192 students
- > Direction and exam for "Kompetenzfeld Sehstörungen" (in cooperation with the institute for physiology)
- > Special examination: "Praktikum Augenuntersuchungen" for 192 students per semester
- > Direction of "Wahlpflichtseminar Augenheilkunde"
- > Direction of "Schlüsselqualifikationskurs: From bench to bedside How to develop a translational research project"
- > Involvement in "Kompetenzfeld Schwindel"
- > Involvement in the course offer "Research Track", lecture series
- > Involvement in preparation course in anatomy orbita

#### B. Sc. Neuroscience:

> Involvement in a lecture series

#### M. Sc. Neuroscience:

> Direction of the module "Retinal Immunology and Gene Regulation", lecture, seminar, practical training, 8 students

#### Apprenticeship:

> School of Orthoptics, integrated into the eye clinic: Currently, 10 students are being trained to become certified orthoptists in the course of a 3-year-program.

#### Training:

- > Examination Center of the International Council of Ophthalmology, ICO
- > Involvement in the BVA-specialist revision

### Events in 2021/2022 (details at www.augenklinik.uk-koeln.de)

- > 33rd anniversary of the Department of Ophthalmology in the "Maternushaus" 02/20/2021
- > Cornea update 04/28/2021
- > Glaucoma update 08/25/2021
- > 20 years of University of Cologne Eye Bank 09/05/21
- > Orthoptics and neuro-opthalmology update 50 years of Orthoptics School 10/27/21

Our courses will probably all take place as online events. For further information, please visit www.augenklinik.uk-koeln.de.

### **Contact Information**

- > 24h emergency outpatient department for ophthalmology
- > Deparment of Ophthalmology, building 34
- > Telephone Service Center +49 221 478-4313 (outpatient appointments)
- > Fax +49 221 478-3186

#### All contact details at:

https://augenklinik.uk-koeln.de/informationen/ansprechpartner-auf-einen-blick/

#### Directions to the University Hospital

Bus: KVB line 146, stop "Geibelstraße"

Tram: KVB line 9, stop "Lindenburg (Universitätskliniken)"

Tram: KVB line 13, stop "Gleueler Str. / Gürtel"

Car: Drive onto the hospital premises: across from the address Gleueler Str. 117, turn left after the gate, straight ahead for 250m. Alternatively, there is direct access to the clinic coming from the north by way of Joseph-Stelzmann-Straße. There are very limited parking options here that require a fee (30 minutes free. The use of underground parking and public transportation is highly recommended during the day.

Underground parking: (About 10-minute walk from here to the clinic) Caution – 2m maximum clearance height Access through cardiology center: across from Kerpener Straße 85 Access through ward building: across from Kerpener Straße 103

You can find further information at: http://augenklinik.uk-koeln.de

#### Imprint

Responsible officials: Frau C. Nolden- Strack (Clinic Consultant, Process- and Quality Management) Univ.-Prof. Dr. C. Cursiefen (Director of the Department of Ophthalmology)

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