

## **Application and selection criteria for students**

The following selection criteria have been defined as a prerequisite to join CCHD:

- ✓ the official admission criteria for PhD students at the MUV
- ✓ documented command of English
- ✓ documented scientific interest and research talent
- ✓ duration of undergraduate studies
- ✓ excellent grades at the undergraduate level
- ✓ letters of recommendation by previous supervisors
- ✓ GRE certificate (alternatively completion of the CCHD admission test)

Further details concerning each of these criteria are given below.

### Official admission requirements:

The official admission requirements for PhD students at the MUV are regulated by § 2 of the Curriculum of the PhD-Studies (see appendix 3). The academic degrees that qualify for participation in the PhD studies at the MUV are:

- final degree in the diploma studies of Medicine or Dentistry
- final degree in any scientific/technical, subject-relevant or subject-related diploma studies
- final degree in studies at an internationally renowned domestic or foreign post-secondary education institution equal to the above-mentioned diploma studies (the rectorate decides about the equality in the course of the admission procedure).

### Documented command of English:

Since English is the language of science and the language of all CCHD courses, participants need to document their English skills, best by providing a TOEFL (see [www.toefl.org](http://www.toefl.org)) certificate.

### Documented scientific interest and research talent

The curriculum vitae should demonstrate that applicants have a particular capability and motivation for scientific work. At least some former experience in laboratory work is required. This should be evident either from a previous publication or from a diploma thesis, at least from a detailed description of a previous research project and an appropriate work plan. According documents must be submitted together with the initial application. Furthermore, the accompanying letters of recommendation must further support these documents, and the scientific interest and research talent will finally be evaluated during the personal

presentations of the applicants in front of all CCHD members, and during the interviews with the members of the selection committee.

#### Duration of undergraduate studies

In light of the high competition between researchers in the biomedical field, there is an increasing tendency to fill positions with younger scientists, and many positions are only available until the age of 35. Therefore, CCHD students should be graduated well before reaching that age in order to give them the opportunity to earn some postdoctoral experience when turning 35. Accordingly, applicants aged above 30 are generally not considered. However, this cannot be an absolute requirement, since a loss of time due to, for instance, maternity leaves or civil services, also needs to be considered. In any case, applicants who, at the time of the advertisement, have been working in one of the participating laboratories as doctoral student for already more than 6 months will not be entitled to apply for CCHD student positions.

#### Excellent grades at the undergraduate level

Obviously, the grades at the undergraduate level will be taken into consideration, particularly when the duration of the undergraduate studies is not the shortest possible.

#### Letters of recommendation by previous supervisors

The applicants are requested to organize that at least two of their previous scientific mentors (preferably the supervisors of the diploma theses) send letters of recommendation. To prevent the submission of letters of recommendation written for purposes other than the application to CCHD, a separate 'referee form' is made available at the CCHD homepage. Applications with letters of recommendations that are not included in this form are not considered further.

#### GRE certificate

Within the application form, applicants are asked to provide a Graduate Record Examination certificate (see [www.ets.org/gre/](http://www.ets.org/gre/)). The best candidates according to the written applications will be ranked along the results of their GRE certificates. Assuming that some applicants won't be able to present a GRE certificate, the most promising candidates will be invited to participate in an online multiple-choice test with questions from each of the four thematic areas within CCHD (neurobiology, vascular biology, immunology, and inflammation). For that purpose, 45 questions will be available at a World Wide Web site that is only accessible with a username and an according password. By email, a date and a time period for the performance of the online test will be arranged; during that time period, the applicant needs

to be reachable by telephone. On the phone, the candidate will receive the entire access information, and will then be given 30 minutes to complete the online test. After these 30 minutes, the online questionnaire is deactivated, and the test is evaluated. The results of the test will be emailed to the candidate. Only candidates who are able to correctly answer at least 67% of the questions (i.e. 30) will be eligible to come to Vienna for the hearing and for personal interviews. Below, several sample questions are listed.

Assuming that the extracellular  $\text{Na}^+$  concentration in mammalian skeletal muscles is about 150 mM and the intracellular  $\text{Na}^+$  concentration is about 15 mM, what is the approximate  $\text{Na}^+$  equilibrium potential?

- A) -60 mV
- B) -30 mV
- C) 0 MV
- D) +30 mV
- E) +60 MV

Blood platelets are generated from

- A) megakaryocytes
- B) monocytes
- C) lymphocytes
- D) granulocytes
- E) endothelial cells

If a compound binds with an affinity ( $K_D =$  dissociation constant) of 1 nM to a receptor, how many receptors are occupied if this compound is present at 10 nM?

about

- A) 1%
- B) 10%
- C) 50%
- D) 90%
- E) 99%

The association rate constant for binding of a compound to a given receptor is  $10^7 \text{ M}^{-1} \text{ s}^{-1}$ .

The  $K_D$  is 1 nM. What is the approximate half-life of the dissociation reaction?

- A) 150 s
- B) 70 s
- C) 15 s

D) 7 s

E) 1 s

Which of the following protein domains binds specifically to phospho-tyrosine residues?

A) SH2-domain

B) SH3-domain

C) PDZ-domain

D) PH-domain

E) WD40-repeat

What is the structural hallmark of a G protein-coupled receptor?

A) 1 transmembrane spanning alpha-helix, (type-II topology = C-terminus extracellular)

B) 4 transmembrane spanning alpha-helices, N- and C-terminus extracellular

C) 4 transmembrane spanning alpha-helices, N-terminus and C-terminus intracellular

D) 7 transmembrane spanning alpha-helices, N-terminus extracellular

E) 12 transmembrane spanning alpha-helices, N-terminus and C-terminus intracellular

Hereditary diabetes insipidus may be caused by mutations in

A) Vasopressin  $V_1$  receptors

B)  $\text{Na}^+/\text{K}^+/\text{Cl}^-$  cotransporters

C) mineralocorticoid receptors

D) Aquaporin-2

E) CLC-1 chloride channels