Title of the Master thesis 

Full name of author

Thesis submitted in partial fulfilment of the requirements for the degree of

Master of Sciences in Life Sciences FHNW

School of Life Sciences

Institute

Supervisor: degree/name of supervisor

Expert: degree/name of expert

Date

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# Introduction

The report of the master thesis is an important document where the work of eight month period is condensed in a single written document. The thesis report is required for assessment but is also an excellent opportunity for the student to present its work for later applications. The report is also of great importance for the School of Life Sciences as the Master thesis reports are long-lasting documents and mirror the quality of the study programme.

Consequently, the master thesis report shall be prepared carefully. This document should guide you how to prepare your report on the master thesis. Above all, the report shall be a precise and complete account of the works done during the thesis. The results must be clearly and unambiguously presented and the interpretation of the results must be comprehensible and skilful.

This Word document may also serve as formatting template for your thesis in order to conform to the corporate design of the FHNW.

# Structure

The report of the master thesis should be divided into the following sections:

* title page
* index of contents
* summary (English and German)
* introduction
* material and methods
* results and discussion
* summarizing discussion or conclusions
* index of abbreviations
* references
* annexes
* acknowledgement
* signed affirmation

## Title page

Provide a brief and informative title which reflects best the results of your master thesis. It is not required that the title matches exactly with the preliminary title of your individual study agreement. This title will appear on your study certificates. Do not use trade names of drugs or abbreviations in the title.

The cover page also includes the following information:

* the name of the supervisor and the expert,
* your name, and
* the date of submission of the thesis.

## Summary

The summary should be self-explanatory and should include the problem, the experimental approach, the major findings and the conclusion. Abbreviations should be avoided. Please provide a summary in German and English (maximal two pages each).

## Introduction

This section should introduce the reader into the subjects addressed in the master thesis. It should be written in a way, that non-expert in the specific field are able to follow. It should state the current knowledge in the field and should conclude with the purpose or aim of the master thesis project.

## Materials and Methods

This section has to be so detailed that another skilled person is able to repeat the experiments. First, all materials, chemicals and technical equipment have to be listed. Then, the methods applied during the master thesis have to be described. Novel experimental procedures should be described in more detail. Methods used in the thesis but which not yielded useful results should be stated, if mentioned in the results section.

If references to published methods are made a short description including the principle of the method should be included.

If hazardous materials and dangerous procedures are described it is mandatory that the necessary precautions are stated.

## Results & Discussion

This part of the report is the most important part of the report and should be the most lengthy. In the result section the experiments (with references to the methods) and the achieved results are stated. The reported experiments should be arranged in a logical order, e.g. experiment B was done because of the results of experiment A, etc.

The results and discussion section can be separated in two separate sections. However, in many cases it is better to combine both sections in order to interpret and discuss the results of experiments and then continue with the next experiment based on the results of the previous experiments. The main results must be discussed by relating to the current knowledge in the field.

To make the result section more readable it is a good practice to shortly state in-between the results section why a particular experiment was done and whether the issue was answered by the experiment.

If experiments require an elaborate analysis it is recommended that on the basis of a representative experiment the analysis work flow is demonstrated in detail commencing with the raw data, followed by the actual analysis with formulas and the final representation of the data.

In case of quantitative results it is necessary that the precision of the result is commented on. The result "not detectable" of a quantitative analysis must be complemented with the detection limit.

In many cases it is advisable that the most important results are summarized in figures and tables. These figures and tables (see also sections \_Ref278894829 & \_Ref278894837) must have a detailed legend to allow the reader to grasp the main results without excessive reference to the main text.

## Summarizing discussion

In this section the student shall present a global discussion of the achieved results followed by a concluding interpretation. The students may also suggest in this section how the problem of the master thesis should be addressed in future work based on the results obtained in the thesis.

## References

It is mandatory that all references made in the text are listed in this section. For practical reason (avoidance of renumbering) the Harvard system for referencing should be used. In this system the in-text citations include the authors followed by the year of publication. If there are more than four authors, only the first author is stated followed by "*et al.*". In case the in-text reference is ambiguous the lower case letter a, b etc. shall be used directly after the year in order to make the references unambiguous.

The reference list is ordered alphabetically according to first author name and year.

## Figures

Well-prepared figures are ideal to visualize abstract data ( \_Ref278215228). Figures should not be used for simple data sets. In this case tables are more appropriate (they give exact figures).

It is important that the layout of the figure is correctly formatted and the information provided is complete:

* Excessive use of color should be avoided, colors should only be used when it is necessary to distinguish a large number of data points.
* The background of a graph should be white.
* The space of a graph should be used effectively (correct range of the axes, logarithmic scales if appropriate).
* If possible, error bars shall be included (and the type of error bar stated in the legend).
* The axes need to be labelled and the units have to be indicated.

The legend of the figure is also important. All information given in the figure has to be mentioned in the legend. All important experimental details and the data analysis method should be stated in the figure legend. As a guideline, the reader should be able to understand the figure without reference to the main text.

Figure . Fluorescence anisotropy titration of fluorescently labelled wt-DNA with ORF56.

Titration of 2 nM fluorescein labelled wt-DNA. Given are the experimental points and a fit based on the A4-B model. The error bars are the standard deviation of each titration point calculated from four to six measurements. In this fit the anisotropy of the unbound DNA is 0.099 and 0.159 for the bound DNA. The dissociation constant based on the tetramer concentration is 1.1±0.1 nM.

Equations, e.g. from regression analysis do not belong into the figure but must be included in the legend with correct variable names and units (e.g.: nphenol=0.5mmol\*A300nm+0.01mmol). The quality of a regression should usually be stated.

Pictures and schemas should be of high graphic quality ( \_Ref278215309). Image processing of pictures is not allowed to change the picture in such a way that the conclusion from the processed image would be different from the one of the original image. As an additional guideline, operations on the picture should be performed on the whole picture and not on parts of it. The use of advanced image processing must be stated.

If figures have been taken from other sources, the source must be stated.

The figures must be numbered and all figures must be referenced in the text.

Figure : ORF904 is a DNA polymerase.

The primer extension activity of ORF904 was assayed between 50 and 90 °C. A 5’-[32P]-labelled 30 nt primer hybridised on M13 DNA was incubated with 0.4 µM ORF904, 0.2 mM dNTPs, 0.2 mM ATP for 15 minutes at the given temperatures. Extension products were analysed on a 5 % denaturing polyacrylamide gel.

## Tables

Tables should be used to represent main results ( \_Ref279487584), comparisons or large amounts of data. Tables containing large amounts of data may also be included in the annex to support the results presented in the main text. Column (and line) headings must include the units. Data must be rounded to the nearest significant figure. If available, standard deviations shall be included.

The legend of the table must be as informative as the legend of a figure (see above).

The tables must be numbered and all tables must be referenced from the text.

Table : Dissociation constants of ORF56 as measured by fluorescence anisotropy titrations.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DNA | buffer | KD [nM] | KC [nM ] e | specificity f |
| wt-F | Tris-HCl | 1.5 (0.63 - 2.45) a |  |  |
|  | Na-Cacodylate | 0.4 b |  |  |
| wt | Tris-HCl | 0.88  0.11 c |  |  |
| rep | Tris-HCl | 210  13 d |  |  |
| CT-DNA | Tris-HCl |  | 670  70 | 270 |
| CT-DNA (53 °C) | Tris-HCl |  | 1220  100 | 1500 |

a range of six independent experiments

b average of two experiments

c determined from a competition assay

d determined from a competition assay, the dissociation constant applies to a dimer half-site equilibrium

e determined from a competition experiment. The dissociation constant KC refers to the microscopic dissociation constant to all unspecific sites on the calf thymus DNA.

f specificity was calculated by KC/KD. KD at 25 °C was 2.45  0.23 nM and 0.8  0.2 nM at 53 °C.

# Language

Students who have started their studies in 2009 can write their thesis in German or English. Students who started their studies in autumn semester 2010 or later have to write their thesis in English unless the cooperating partner requires the thesis to be in German.

Methods and Results are written in past tense, discussion and interpretation in present tense. Laboratory slang has to be avoided. Expressions in foreign languages including species names must be in italics. Gene names, i.e. *lacI*, (but not protein names) are in small letters and italics.

# Available format styles : Überschrift 1

These format styles may be used (see also \_Ref279583378 and \_Ref279583391).

## Überschrift 2

### Überschrift 3

#### Überschrift 4

##### Überschrift 5

###### Überschrift 6

Table : Title for figures and legends

Legend: The legend is formatted in single-spaced lines. The new paragraph is automatically standard format again.

Figure : Overview of styles formats

There is a set of formats defined for the headlines and the index. In addition, there are two formats for figures and tables: the title and the legend.

# Index of abbreviations

Abbreviations should be used when the terms are used a number of times in the report. All abbreviations (except SI units) must be listed in the alphabetically ordered abbreviation index.

|  |  |
| --- | --- |
| FHNW | Fachhochschule Nordwestschweiz |
| AU | arbritary units |
|  |  |

# References

References are listed alphabetically according to first author and then year. Titles of books, book chapters and journal articles have to be included. Long author list may be truncated.

I hereby affirm that the master thesis at hand is my own written work and that I have used no other sources and aids other than those indicated.

All passages, which are quoted from publications or paraphrased from these sources, are indicated as such.

This thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

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Place, Date Signature