The LAB BOOK
The Most Underrated Soft Skill

25th FEBS YSF – *Wageningen*

"Career Skills

Saturday 4 July 2026

Belgian Society
Biochemistry
& Molecular Biology

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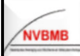

What is your « *Lab Book* »?

- **Story of your life** .... In the lab!

- Of your daily life at the bench
- Of your scientific thoughts
- Of your daily work
- Work progress (e.g. time line, ….)
- Of your PI/Supervisor's remarks/Suggestion/Comments
- Maybe also some things you have read, ideas you had

- Its your lab "*autoLABOgraphy*"

What should your Lab Book really tell?

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- Your lab *autolabography* is about your "*lab life story*":"
  - ☞You are the author so you think it should look "good" **????**
- But it is not a novel …. Not meant to be a best seller …
  - ☞IT IS A LOG BOOK ➔It must tell
    - The GOOD
    - The BAD
    - The UGLY

The Bottom Line?

Its the *Bad* & the *Ugly*

That are going to make you do the

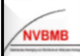
Good science

So what is your Lab Book's purpose?

- Follow up of experiments => Experimental Flow => Research Finality
- Traceability of Experiment and Sample
- Results & Interpretations
- Scientific Integrity
- Proof of experiments and results and dates
- Contribute to the labs group research advancement - Discussions
- Write up your articles
- Write up your thesis

WHYYYYYYY ????

BECAUSEEEEEEEEEEEEEEE !!!!!



Do you really think

that you will remember tomorrow

what you did today?

What should be in your Lab Book?

Planning

- ✓ Purpose/Goal/Question Asked of the Experiment(s)
- ✓ What you plan to do
- ✓ How you will do it
- ✓ What you will do

Action

- ✓ What you actually did

Outcome

- ✓ What were the outcomes – RESULTS
- ✓ What it means to you – the interpretation
- ✓ What to do next

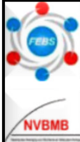
What you actually do????!!!

- This is where The Bad & the Ugly ..... and also the Good are consigned
- Here is where you describe what you do

everything you do - everything that happens

- The changes made (to protocols or during the experimental procedures)
- The temperatures (what is a "*room temperature*"??)
- The timing – incubation times (what is an "*overnight incubation*"??)
- OBSERVATIONS MADE e.g.: un unexpected change in color or transparency, a precipitation, a drop lost, a drop to much, no sure of exact volume, mistake in timing, temperature, sample,...

WHYYYYYYYY ??????



BECAUSEEEEEEEEEEEEEE!!!!!

Murphy's Law is especially true in the lab

"If anything can go wrong it will !!!"

Luckily " Richard Zeckhauser" said:

" Sometimes things that should not work, work nevertheless "

Murphy's Law is a well-known adage that states "Anything that can go wrong will go wrong." This phrase captures the essence of unexpected failures and mishaps that can occur in various situations. It originated from the aerospace engineer Edward A. Murphy Jr. in the late 1940s,

Luckily "Sometimes systems that should not work, work nevertheless." Richard Zeckhauser, a professor for political economy at Harvard University

What should your Lab Book allow you to do?

- Discuss results with your supervisor or PI – at Lab Meeting
  - ☞ Plan next experiment(s)
  - ☞ Know what was done
  - ☞ How it was done
  - ☞ Results generated
  - ☞ Communicate be able to describe it to colleagues and PI/Supervisor
  - ☞ Write it up
  - ☞ AND ………………→

AND ……………………→

AND ……………………………→

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Your Lab Book should allow you and others

☞ TO ANSWER QUESTIONS KNOWLEAGEABLY!!!

☞ And always allow others to:

- ✓ *Understand* what was done
- ✓ *To Reproduce* and/or *Pick Up where you left off* when you leave the lab for new adventures!!

ANSWER THE QUESTIONS KNOWLEAGEABLY ????

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Let us look at a typical scenario!

PI: *"How much antibody did you use on your blot? Or PCR product did you put on gel? Or the amount of primers used (final concentration)? Or antibiotic used for selection? Or was the serum heat inactivated?"*

The Young & Bold & Growing Scientist : "20 µl"

PI: *That does not mean anything!!! 20 µl of what? What was the dilution of your antibody or volume of your PCR reaction or the concentration of your primer stock and dilution factor? ……."*

The Young & Bold & Growing Scientist: looks in her/his lab book - Oups *"Euh .. I didn't write that down"*.

It was last week and she/he does not remember …. Of course

PI: 🙄 or maybe even 😡 because it is lost experiment – it is YOUR time & PIs money 😡

The HOWs & DOs

1) Experiment Information - Planning

- To start .... **THE** ***DATE***
- Indicate what is the Question you are addressing (project or sub-project)
- Mention what is the Purpose of the planned experiment(s)
- Describe the Experimental Design
- List what you are Going to do

2) Preparation - Action

- List samples to be used (name, type, origin, date, concentration, stored…)
- List materials to be used (primers, antibodies, buffers, culture media, antibiotics, …) ➔ *name and reference are often essential to know*
- Protocols List how you are going to do it
  - Describe all the steps: You must list procedures used, e.g. paste a print out if it's a routine lab procedure, …
  - Modifications made: If using a "user's manual" mention which one (kit reference), version and describe any
- Provide space for indicating relevant information during & after the experiment(s)

3) Experiment Outcome

- Readouts - Results – Comments & INTERPRETATION(s)
  - Copy of
    - ✓ Tables
    - ✓ Picture/Images - if it is a digital file indicate file names(s) and location(s)
    - ✓ Instrument printouts
  - Remarks, Comments, Conclusions for the given experiment(s)
  - ANNOTATE PROPERLY ALL IMAGES/INSTRUMENT PRINTOUTS
  - If problems and/or inconsistencies arise point out & indicate possible reasons
  - **Interpretation(s)**
    - ✓ Indicate the follow-up, i.e. what next?
    - ✓ Next steps or controls to do or experiments for problem solving .....

WHAT DOES YOUR LAB BOOK LOOK LIKE??

DOES YOURS ALLOW YOU TO:

- ☞Understand what the question(s) is/are addressed.
- ☞Redo the experiment = Understand what was done, how it was done, and exactly what materials/reagents were used.
- ☞Interpret the results and answer the question(s).
- ☞Next step(s)

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2026 YSF

50th FEBS Congress 4-8 July 2026 Maastricht, The Netherlands

Biochemistry for the next 50 years

Thanks for your Attention

Darwin's "Tree of Life" sketch, from his Lab notebook. The Text starts with:

"I think …."

Do you???

From: https://betterscienceteaching.com/2013/04/18/famous-science-notebooks/

Belgian Society Biochemistry & Molecular Biology

Jason PERRET *The Lab Book - Most Underrated Soft Skill* 25th FEBS YSF – Career Skills – Saturday 4 July 2026

Darwin's "Tree of Life" sketch, from his notebook. The Text reads, "I think
https://betterscienceteaching.com/2013/04/18/famous-science-notebooks/
The text on this page reads: Case must be that one generation then should be as many living as now. To do this & to have many species in same genus (as is) requires extinction.
Thus between A & B immense gap of relation. C & B the finest gradation, B & D rather greater distinction. Thus genera would be formed. — bearing relation"…

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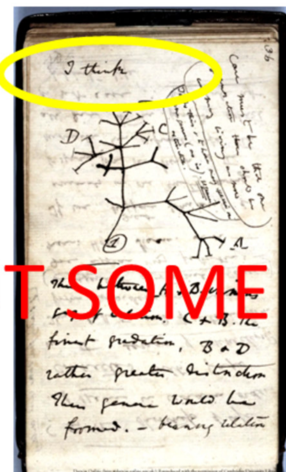

CHECK OUT SOME EXAMPLES

AND NOW SEE WHAT YOU « *THINK* »
WHAT DOES YOUR LAB BOOK LOOK LIKE??

EXAMPLE 1 - WB page 1

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Very Good! A date

Wednesday 10/01/18

Western blot of timecourse for IMP3 in BEL-As and HiDEPs

Good! Experiment Purpose

GOOD! Clear Table with conc, & volumes a reagents used

Sample	Date sample made	Concentration (µg/µl)	Amount for 30 µg protein (µl)	Amount of dH2O (µl)
BEL-A2 day 0	27/04/2017	7.4	4.05	5.95
BEL-A2 day 4	17/07/2017	5.6	5.36	4.64
BEL-A2 day 8	17/07/2017	6.4	4.69	5.31
BEL-A2 day 10	17/07/2017	5.5	5.45	4.55
BEL-A2 day 12	17/07/2017	6.1	4.92	5.08
HiDEP day 0	21/05/2017	6.53	4.59	5.41
HiDEP day 2	21/05/2017	10.0	3.00	7.00
HiDEP day 4	21/05/2017	8.27	3.63	6.37
HiDEP day 6	21/05/2017	8.77	3.42	6.58
HiDEP day 8	21/05/2017	8.09	3.71	6.29
HiDEP day 10	21/05/2017	7.84	3.83	6.17
HiDEP day 12	21/05/2017	8.04	3.73	6.27

Good! Experiment details

Added 10 µl of 2xSDS PAGE sample loading buffer with 100mM DTT (freshly made). Heated to 100C for 5 minutes. Loaded onto a 10% gel and ran for 1 hr.

Lacking electrophoresis conditions

Loading order:

Acronyms used not consistent between table and gel loading chart

Membrane 1

		M	B2D0	B2D4	B2D8	B2D10	B2D12	M	

Good! Gel Loading details

Membrane 2

M	HD D0	HD D2	HD D4	HD D6	HD D8	HDD 10	HDD 12	B2 D4	M

Good! Cross gel control used & described

The BEL-A2 day 4 sample was loaded on the HiDEP membrane as a control to check equivalent loading between the membranes.

Transferred to PVDF membrane overnight at 30V (960 minutes).

GOOD! Detail on how blots were processed

Thursday 11/01/18

Western blotting continued

Good! Experiment Title for continuity

Blocked for 1 hr in 10% milk.

Washing & Blocking volumes missing

Cut the blots just above the 55kDa marker band.

Top half of blots:

- Primary antibody: ab179807 IMP3 antibody 1:1000 in 2% milk
- Secondary antibody: anti-rabbit HRP 1:2000 in 2% milk

No info on ab brand and cat no

Bottom half of blots:

EXAMPLE 1 - WB page 2

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Date missing on this page

dd/mm/yyyy

- Primary antibody: beta-actin antibody (sigma) 1:4000 in 2% milk
- Secondary antibody: anti-mouse HRP 1:2000 in 2% milk

Good! Ab details + brand

Bad! Cat no missing

Good! Process detailed

Incubated with each antibody for an hour, with 3x10 minute washes in PBST between the primary and secondary antibodies. Washed 3x10minutes before developing the blots with the AI600 imager in Ash's lab.

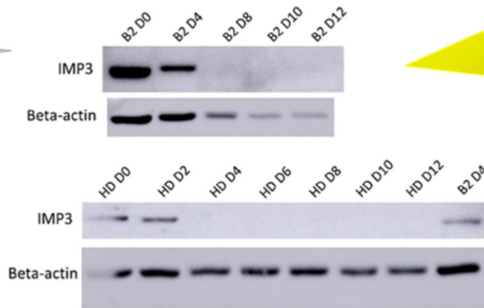
Bad! Wash/Block volumes missing

Developing:

Good! Process nicely detailed

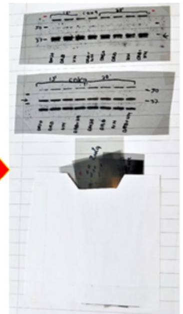
- Auto exposure (< 1 minutes) – BEL-A2 IMP3 blot top; HiDEP IMP3 blot bottom (used high sensitivity ECL reagents)
- Semi-auto (2 mins 50 s on the fainter HiDEP IMP3 band) – BEL-A2 IMP3 blot top; HiDEP IMP3 blot bottom (used high sensitivity ECL reagents)
- Auto exposure (<1 minute) – BEL-A2 beta actin blot top; HiDEP beta actin blot bottom (regular ECL reagents)

Good! Images annotated for samples/conditions



GENERALLY: NO COMMENTS/REMARKS RELATED GEL PHOTOS

Lab Book should always have a scan of the WHOLE GEL. Image ban be broken down alongside for analysis.



EXAMPLE 2 - PCR page 1

Very Good! A date

Very Good! A full title with: What for, On what sample, Why!

Very good – refers back precisely to previous experiment

Table missing with all ingredients, quantities, concentrations, ref (date, name,..). Working table to tick off as well while doing!

What does 1 µl correspond to?? Concentration lacking!

Good! A Table

What Conditions? Buffer, mA
Staining? How, with what stain, ...

Tuesday 31/01/17

PCR with GAPDH primers to confirm cDNA present in all samples to support PCR result from 26/01/17
cDNA samples from first-strand cDNA synthesis from 23/01/17

Made master mix according to protocol with all reaction components except template

Then added 1µl of each template and 1µl of dH_2O [illegible] another tube as a control.
Follow PCR reaction tubes (and loading order for agarose gel)

+dH_2O GAPDH primers (control)	Peripheral blood D5 GAPDH primers	Peripheral blood D7 GAPDH primers	BEL-A2 D0 GAPDH primers	HiDEP D0 GAPDH primers

Ran gel on a 1% agarose gel (6µl marker, 10µl of each sample)
100V for 40mins

Primer ref, sequences, or references to where can be found in lab book

What protocol? Give reference where to find it or a Name ...

There are about billion different GAPDh Primers available: which one

Which Marker (Brand, Cat #, ..),

PCR final Volume? 10 µl of how many?

EXAMPLE 2 - PCR page 2

To bad: DATE missing on all page.

Good, but ...

What was expected??

GENERALLY: NO COMMENTS/REMARKS RELATED GEL PHOTOS

Very Good! Gel Annotated

What MW marker was expected??

Interpretation:
- Results description
- Expected
- Signification
- What Next

Example 3 - Western Blot page 1

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GOOD! A Date

What protocol, how, what reagents

GOOD! Header Clear

GOOD! Table

What does second table correspond to??

Wednesday 15/02/17

SDS-PAGE

Made two 12% acrylamide gels (10 wells)
Prepared the following samples for analysis by Western Blot with IGF2BP1, 2&3 antibodies

For probing with IGF2BP1, 2 antibodies, 30μg of each protein sample are required

Sample	Protein conc. (μg/μl)	μl/sample for SDS-PAGE
PBD5	6.5	4.62
PBD7	5.8	5.17
BELA2 D0	6.6	4.54
HiDEP D0	4.8	6.25

And for IGF2BP3 antibodies, 20μg of each are req

Sample	Protein conc. (μg/μl)	μl of sample for SDS PAGE
PB D5	6.5	3.08
PB D7	5.8	3.45
BELA2 D0	6.6	3.03
HiDEP D0	4.8	4.17

BAD! No Title: Project, Experiment Objective, Context, …

Ab Brand, cat #, stock concentration ….

GOOD! But 30 μg calculation in 1st table

Calculation corresponds to ~19,7 μg ???? Nowhere mentioned.

Example 3 - Western Blot page 2

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DATE missing.

* protein amounts and antibody concentrations used according to experiments Mac did previously *

Who is/what is "Mac" ????? No way of reproducing experiment with this information

GOOD but could have been in the previous table to have a overview of reaction mixture and tick off as added

Made each sample to 10µl with dH_2O, added 10µl 2x SDS sample running buffer, heated at 100°c for 1 minute

What marker?, Brand, cat#, eventually a copy of the molecular weights and distribution in the same type of gel.

Loaded each sample onto gel plus 7µl marker. Ran gel at 150V for 1hr.

What type of gel, %, gradient, denaturing, commercial, ...

Transferred how? Method?

Removed gel from glass plates and transferred to PVDF membrane for 100V for 1hr.

Is this a typical Lab protocol???

Blocked membrane for 1hr in 10% milk in 1xPBST (0.02% tween)

Transfered to falcon tube with 2ml 2% milk in 1xPBST plus following concentrations of each antibody:

- 1:500 IGF2BP1 (ie. 4µl) (Mac's protocol)
- 1:3000 IGF2BP2 (ie. 0.7µl)
- 1:1000 IGF2BP3 (ie. 2µl) (Mac's protocol)

Left on roller overnight at 4°c

GOOD! Ab dilutions and volume stock used in the 2 ml binding solution ..

Does not mean a thing, useless information, does not explain how and what was done!

BAD!! Brand, cat#, species specificity, host species, ...

What is "overnight" ?? 12, 14, 16, 18 or 20 hours???

Example 3 - Western Blot pages 3/4

GOOD! A Date

Ab info: Species, brand, cat# .... There are millions of commercial HRP abs

Detection reagent info: Brand, cat#, protocol (amounts, incubation times, ...)??

GOOD! Blot image annotated and MW as well!

Is this the 1' or 10' exposure? Expected MW of the specific band?

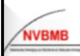
IN GENERALLY: NO COMMENTS/REMARKS RELATED TO GEL PHOTOS

DATE missing.

GOOD! Blot image annotated and MW as well!

No explanations on what should be seen, what is seen, interpretation, meaning ... what next!

No explanation concerning IMP3 .. Was this to be expected? Unexpected results? Then some explanation/hypothesis to why. What workaround??



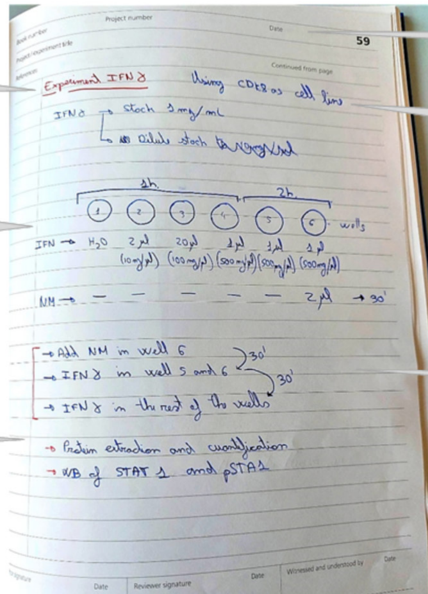
Example 4 - Inhibition of CDK8 in CDK8As cell line page 1

BAD! Date??

Title a bit short to describe experiment purpose

What cell line (passage number, confluency, culture conditions, …

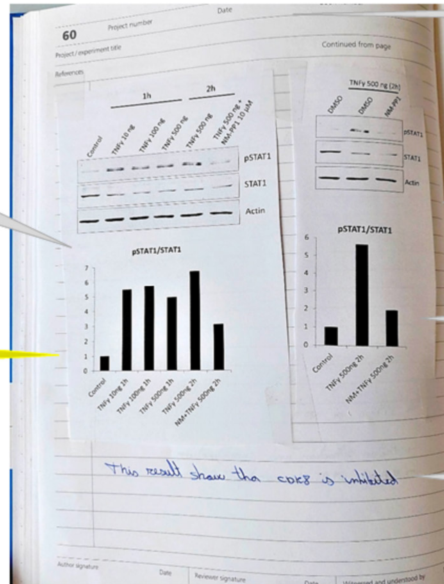
Good. Experimental conditions, well layout, concentrations, volumes



GOOD! Reagent addition, timing

Good. Next steps

Example 4 - Inhibition of CDK8 in CDK8As cell line page 2



BAD! Date??

GOOD! Image printouts clear and annoted with experimental conditions

GOOD! But 30 µg calculation in 1st table

How were the WB bands quantified, no explanation on instrumentation, calculations, ..

GENERALLY: NO COMMENTS/REMARKS RELATED GEL PHOTOS

OK, but no explanations on what to see, interpretation, nowhere "CD8" appears in graphs!

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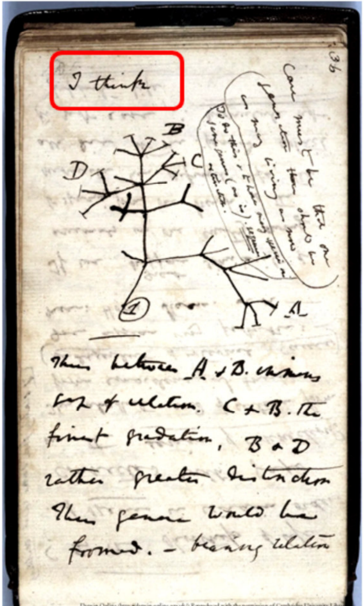

"Think, think, think …."

AND

HAVE FUN

From: https://betterscienceteaching.com/2013/04/18/famous-science-notebooks/