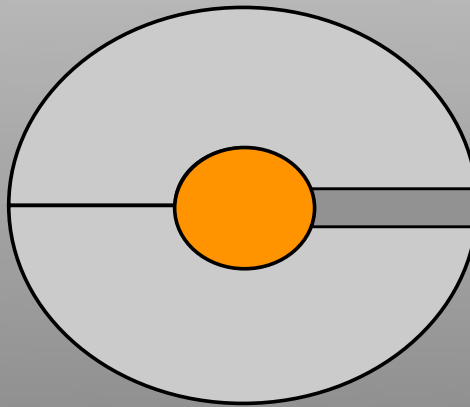


The

TRAUNER GROUP HANDBOOK

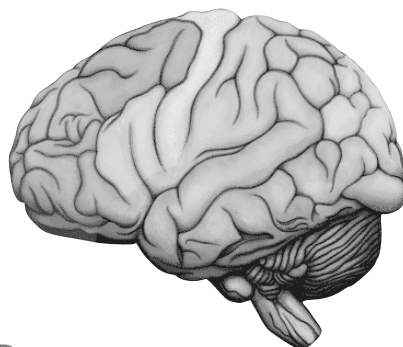


Dirk Trauner

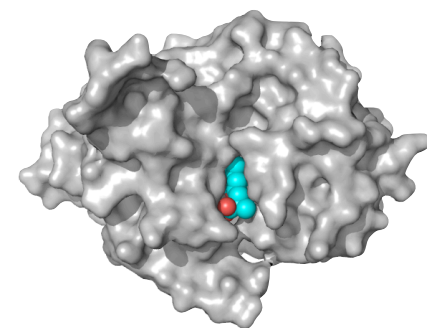
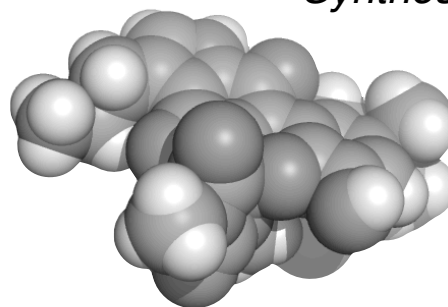
Version 5.0 • Munich, May 2014

What we stand for

Chemical Neuroscience



*Natural Product
Synthesis*

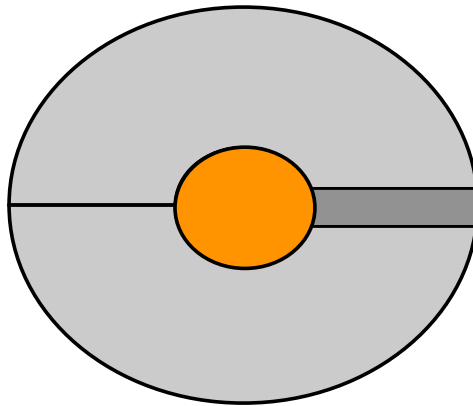


Photopharmacology



Chemical Vision Restoration

Our official logo



Getting started

“Laufzettel”

Laufzettel Department Chemie und Biochemie, LMU München

Einstellungsdatum: _____

Ausscheidedatum: _____

Name:		Arbeitskreis oder Abteilung:	
Vorname:		beschäftigt als:	

Achtung: Viele wichtige Informationen und Formulare sind im **Intranet** unter “<http://www>“ zu finden!

Aktion	Ausgabestelle	Erhalt bestätigt: (Mitarbeiter/in)	Rückgabe bestätigt:(Ausgabe)
Schlüssel Nr.: Raum: Nr.: Raum: Nr.: Raum:	Herr Thaumüller, Referat II B 5, Tel: -79151, C5.003		
		Datum Unterschrift	Datum Unterschrift
Codekarte Gebäudezutritt	Frau Kohler, Referat II B 5, Tel: -79150, C5.005, (Formular im Intranet [“ http://www ”] ⇒ Referat II B5 ⇒ Formulare)	Datum Unterschrift	Datum Unterschrift
Personenkarte, weiß	Fr. Buchholz, Tel: -77785, CU1.021 (Formular im Intranet [“ http://www ”] ⇒ Ver-/Entsorgung ⇒ Barcode-Karten)	Datum Unterschrift	Datum Unterschrift
Telefon-Verzeichnis	Frau Schöler, F0.042, Bitte per Email: ulrike.schoeler@cup.uni-muenchen.de	Datum (Eintrag)	Datum (Austrag)
Email-Adresse	Haus D: P. Mayer, Tel: -77347, D0.033 Haus E: Dr. Ehrl, Tel: -77559, E1.060 Haus F: C. Singer, Tel: -77644, F0.047	Datum (Beantragung)	Datum (Löschung)
Arbeitskleidung und Schutzausrüstung	Zuständiger Sicherheitsbeauftragter des jeweiligen Arbeitskreises	Datum Unterschrift	Datum Unterschrift
Platzübergabe ordnungsgemäß	Arbeitskreisleiter/in, Vorgesetzte/r		
		Datum Unterschrift	Datum Unterschrift
Sonstiges		Datum Unterschrift	Datum Unterschrift

Abschlussunterschrift AK-Leiter/in oder Beauftragte/r

- bitte wenden -

Aktion	Abteilung	Einweisung durchgeführt von:
--------	-----------	------------------------------

Checking in

- See Prof. Trauner about your project and lab assignment.
- See our Frau Grilc about your paperwork, keys, internet access, NMR, MS, library etc. privileges, locker etc. (see “Laufzettel”).
- See Martin and Luis about the lab equipment. A standard setup includes argon/vacuum line, pump, rotavap (share), glassware, stirrers, etc. and will be replenished if needed.
- Get a group job assigned.
- Apply for scholarships as soon as possible (graduate students).

Getting off to a good start

- There's only one chance to make a first impression.
- Gain the trust of your supervisor and your colleagues. Remember: the best new projects are given to the most trusted coworkers.
- Settle in your workspace: Make standard solutions, renew the tubing, check the vacuum etc.
- Run your first experiment quickly. Get your hands wet as soon as possible (ASAP).
- Participate actively in group meetings.
- Don't go on a vacation shortly after joining the group.

Scholarships and other incentives available for Master and Ph.D. students

- Fond der Chemischen Industrie: Fondstipendium.
- Fonds der Chemischen Industrie: Kekulé-Stipendium. *Only if you come from a different university than LMU.*
- Studienstiftung des Deutschen Volkes.
- Boehringer-Ingelheim Stipendium. *Emphasis lies on biosciences.*
- Graduiertenförderung nach dem Bayerischen Eliteförderungsgesetz
- Novartis Graduate Fellowship in Organic Chemistry
- Dr. Klaus Römer-Stiftung. *Awards exceptional work performed at LMU with cash prizes.*
<http://www.cup.uni-muenchen.de/roemer/aktuell.php>.
- Industrial “Praktika”, e.g. at Novartis or Givaudan (2-6 months). *These can be carried out before you join the group for a Masters or in between your Masters and Ph.D. work.*
- Extended “Dienstreisen” to Berkeley and other nice places.

Scholarships and incentives available for postdocs

- Humboldt postdoctoral fellowship. <http://www.humboldt-foundation.de/web/771.html>.
- LMU Research Fellowship CAS: http://www.en.cas.uni-muenchen.de/fellowship_program/index.html.
- Marie Curie Fellowship: <http://cordis.europa.eu/mariecurie-actions/>.
- Various national programs (e.g. SNF, NEC etc.).
- Dr. Klaus Römer-Stiftung. *Awards exceptional work performed at LMU with cash prizes.*

Our web-page as a key resource

- It's our window to the community.
- The new version is online, I will curate it.
- If you find mistakes, want to suggest improvements, contact me ASAP.
- Templates for Denksport, Presentation, Publications, difficult-to-draw molecules etc. are provided.
- Useful physical data (pK_a 's, BDE's, Mayr scales etc.)

Responsibilities and Opportunities

Work-ethic and vacation policies

- Be prepared to work 6 days a week. I am not kidding. We will not be able to compete internationally otherwise.
- The core work hours are between 10 AM and 6 PM. I expect the whole group to be present during these hours.
- “*Vacations can be bad for your health*” (S.J. Danishefsky). You’ll loose momentum by taking too many breaks. Vacations during the semester are strongly discouraged. I would rather have downtime in August than members of the laboratory missing during the semester.
- Send an e-mail with the dates of your absence to Prof. Trauner and Frau Grilc. We will keep an internal vacation calendar, so I will have a sense of who is there.
- When you say “I will be back on the XX..” this should refer to the morning you show up for work and not the the Friday afternoon you arrive at home.

Remember:

“Activity Drives Discovery”

Progress reports

- Provide a progress report every 3 months. For 2014 the submission dates are : **January 13**, **April 14**, and **October 13**. You'll get a reminder from Frau Grilc.
- The progress report should be a ChemDraw or Word file and can be highly graphical. A template is provided on our Web-Page. You can use this ongoing file for you research group meetings. If you prefer you can also submit it in the format of a paper (e.g. using the *Org. Lett.* Template)
- Submit the final report/thesis both as a hardcopy and in electronic form.
- A final report in the format of a thesis of paper is required within 2 months after you leave from postdocs, bachelor students, masters students, visiting exchange students etc. Do not expect any further support unless you have submitted your report.

Final reports

- As a Postdoc you are expected to submit a final report within one month after you leave the group. This can be voided if a paper is in the making.
- Of course, for Graduate and Masters Students, their thesis counts as final report.

Before you go on a vacations

- Make sure that you have taken care of everything (e.g. contributions to a paper, such as Supporting Information data) that could be required in your absence.
- Put a sign on your desk with the dates.
- Let your lab-mates know when you are gone.

“Activity Drives Discovery”

Organizing your day

- Develop a daily routine.
- Start with a “To Do” list. Anticipate what you want to achieve today. Set a goal for the day and strive to achieve it.
- Start up the machinery (pump, rotavap, dry ice, liquid nitrogen etc...) first thing in the morning.
- Get something going *before* lunch break/group meeting/seminars etc.
- Avoid distractions such as the internet, people, phone-calls, text messages etc. Remember: Don't let other people or useless information steal your time and attention.

Organizing and curating your compounds

- Label everything to avoid confusion and unnecessary repetition.
- Develop a labeling system that corresponds to your lab journal for purification fraction, clean and characterized compounds. (e.g. DNY-3-25-c for fraction c in notebook 3, page 25 and **DNY 3-33** for a pure compound).
- Always assume that compounds are unstable. Don't leave compounds on the bench. Avoid light, oxygen, hot temperatures. Highly unstable compounds are best stored in a frozen benzene matrix. We have a -78° fridge in the HPLC room for that purpose.
- Avoid chemical graveyards, e.g. in deep freezers, remote cabinets etc.
- When you leave the group and leave compounds behind label them according to your thesis/final report and provide a structure on the vial/flask !

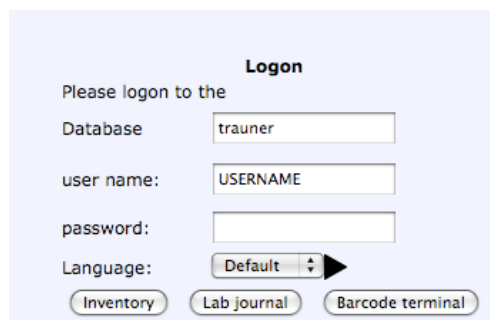
Organizing your data

- Use the electronic lab journal or use a standard format lab journal.
- Keep a copy of your lab journal in a safe place in case you lose it (e.g. in a fire).
- Develop a labeling system for your fractions and final purified/characterized compounds.
- Keep a list of required characterizations.
- Keep your hardcopies in a way that they can be quickly retrieved (Binder, Manila envelopes etc).
- I have found it helpful to keep one large ChemDraw file (in our standard format) for each project, which lists all the structures, allows for quick calculations of formulae, masses etc.

Required characterizations

- Molecular formula, calculated molecular mass.
- HRMS, calculated and found.
- Retention times or factors (eluents) .
- Melting points (if applicable).
- ^1H -NMR spectrum (field strength, solvent).
- ^{13}C -Spectrum (field strength, solvent).
- Heteronuclear spectra, if applicable (^{11}B -, ^{15}N -, ^{31}P - etc.).
- Multidimensional spectra if applicable (HMBC, HSQC, COSY, NOESY, ROESY etc).
- IR (method).
- Optical rotation, if applicable (with wavelength, conc., solvent)
- X-ray (if applicable). Deposit the structure with the Cambridge Crystallographic Data Centre (CCDC) ASAP!

The electronic lab journal



The screenshot shows a web-based login form titled "Logon". It contains the following fields and controls:

- A heading "Please logon to the".
- A "Database" label followed by a text input field containing the text "trauner".
- A "user name:" label followed by a text input field containing the text "USERNAME".
- A "password:" label followed by an empty text input field.
- A "Language:" label followed by a dropdown menu showing "Default" and a right-pointing arrow.
- At the bottom, three buttons: "Inventory", "Lab journal", and "Barcode terminal".

- The more students use it the better it will become.
- Print it out in regular intervals (e.g. every 20 reactions). Save it as a pdf.
- Use your common sense and don't trust the calculations blindly.
- When you enter the group, see the assigned group czar to set up your account and get an introduction to the program. You can tell him about problems you're experiencing, too - but no whining please.

Teaching and supervising

- As a graduate student you will be required to teach once in a while. This is regardless of whether you have a “Hausstelle” or are on a scholarship.
- This will take away some of your time but it is also an opportunity to identify highly qualified “Praktikanten” and potential future group members.
- Set up experiments *before* you teach.
- Occasionally I’ll ask you to assist me in oral examinations or proctor written exams.
- You are welcome to volunteer as a teaching assistant for my own classes (e.g. OC1). You will certainly profit from it.
- If you take on a “Praktikant” set high standards from the beginning. You need to invest time and effort before you can reap the returns. Introduce him/her to me and make them bring cake.

The yearly cycle

- Early January: Classes resume.
- January/February: Ski trip.
- Mid February-mid April: Semester break.
- March: Spring cleaning.
- End of July/mid October: Semester break.
- September: Fall cleanup.
- October: Römer Prize deadline.
- December: Holiday party.
- Late December: Römer Prize / Graduation ceremony.
- End of December - early January : Holiday break.

The weekly cycle

- Monday at 11 AM: Departmental seminar. *During the semester, usually biweekly.*
- Monday at 10:30 AM: Subgroup Meetings
- Tuesday at 1 PM: Denksport
- Tuesday at 5 PM: GDCh lecture. *During the semester, usually biweekly.*
- Wednesday at 10 AM: Group meeting
- Thursday at 10:30 AM: Biojournal club

Maximizing your success

- Run at least one experiment per day. You can easily run several if you plan well, run parallel reactions etc.
- Do your analytical work *without delay*, as you go along.
- Check and double check your calculations, especially when you set up experiments. Be paranoid about potential mistakes. Think about orders of magnitude (does it make sense?).
- Calculate yields as soon as possible.
- Interpret your spectra properly and *fully*. Do not just check for what you want to see. Make sure all the spectra are consistent. Be prepared to describe your spectra without looking at them.
- Keep your records and samples well-organized.
- Know the literature in your immediate area of investigation.
- Always check the the databases and Web-resources (e.g. Reaxys, SciFinder, Web of Science, Google) concerning the molecules and subjects of your investigation. Set up notifications.

Maximizing your success

- Make sure you have checked the appropriate handbooks and resources (e.g. EROS, Organic Synthesis, Organic Reactions, Houben-Weyl etc) before you run an experiment.
- Think! Think all the time! Think in advance. Anticipate what you need to run the experiment. Think how you are going to isolate your compounds. Think about potential pitfalls. Think about potential shortcuts (but don't cut corners). *"You don't have to work all the time but you have to think all the time"* (Bob Grubbs).
- Before you run an experiment ask around. Ask me. Ask the group. Ask in the department. Always strive to learn from other people. Don't ever assume that you have already figured it all out and don't need to improve and learn continuously.
- Do not talk yourself out of running an experiment.
- Be respectful and helpful to your coworkers. Strive to be the "Go-to Guy".
- Maintain a generally positive attitude.

Staying motivated

- When you have a bad day in the lab, clean your workspace, re-gear your equipment.
- A little sarcasm is fine but don't get overwhelmed by cynical behavior. Avoid spreading bitterness at all cost. It will hurt you and the group and you will gain nothing.
- A major change in a project is sometime necessary. Remember: *"The difference between persistence and stubbornness is success."*
- Don't give up easily. An experimental science is also a character education. Your persistence and creativity in overcoming difficulties is one of the most important factors in your evaluation.
- Luck is an intrinsic quantity. This means the more you work the more luck you will have.

Remember:

Nicht schwächeln - no whining !

Reasons for dismissal

- Lack of commitment. *If you are not really committed to our science it's better for yourself and the group if you pursue other career options. In everybody's interest, you should realize this sooner rather than later.*
- Lying/cheating on your results. *Scientific fraud usually starts with a small lie that needs to be backed up with others and snowballs into something that you cannot control anymore.*
- Unsafe and exceedingly messy working habits. *Chemistry involves certain hazards and it is essential that we trust in each other's ability to deal with them properly.*

Group jobs

To be avoided:



“Not my job, man...”

Group jobs

- Safety. *Implementing and monitoring safety measures.*
- Emergency list. *Keeping a list of contact numbers, next of kin etc..*
- Group room. *Cleanliness and appearance of the group room.*
- Espresso machine. *Maintenance, cleaning, supplies.*
- Beverages. *Ordering.*
- Computer room / printers. *Responsible for cleanliness of the computer room and its printers.*

Group jobs

- Web-Page. *Maintaining and updating our web-page.*
- Denksport. *Maintaining the website.*
- PC environment. *All issues involving PCs.*
- Mac environment. *All issues involving Macs.*
- Molecular modeling and visualization. *Pymol, Macromodel etc.*
- Scheduling. *Group meetings, Denksport, biojournal club, social functions etc.*

Group jobs

- AEKTA. *Maintenance, columns etc.*
- Electrophysiology. *Rigs, MEA, Nanion, TEVC etc.*
- Cell culture. *Incubators, solutions etc.*
- Biochemical equipment. *Fermenter, PCR etc.*
- Pumps. *Maintenance, oil etc.*
- Glove Box. *Pump, protective gas, moisture, oxygen, cleanliness etc*
- Dishwasher
- Chemical inventory. *Maintenance and updates*

Group jobs

- Ordering chemicals.
- Picking up chemicals.
- Stains. *Preparing, testing, maintenance..*
- Nitrogen. *Also on weekends, during down-time.*
- Solvents. *Ordering, monitoring quality.*
- THF still. *Quality control and cleaning.*
- Amine stills. *Quality control and cleaning.*
- Silica. *Ordering, maintaining and cleaning the filling station.*

Seminars, Meetings and Conferences

Group Meetings

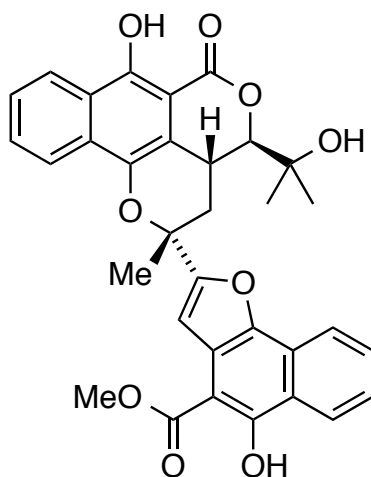
- Our group meeting is dedicated to housekeeping issues, progress in our research, and literature surveys.
- Attending the housekeeping part is mandatory for everyone.
- Starting in 2013 we will run three types of research meetings: a) those focused on total synthesis and methodology, b) those focused more on chemical biology and neuroscience, and c) meetings dedicated to literature topics. These have to be prepared professionally to be able to share it with the community (like others do).
- You are very welcome to attend all types of meetings. In fact, as of courtesy toward your colleagues and to broaden your knowledge and create synergies, you are strongly encouraged to do so. However, in order to increase productivity you can leave the meeting the topic is remote from your research (synthesis vs. neuroscience).
- If there is a presentation on a topic where I want everybody to attend I will announce it separately.

Preparing and Delivering a Group Meeting

- Discuss the topic with me. It can either be a research progress report or a lecture on a special topic.
After you join the group you should give a meeting on your previous work.
- Prepare your presentation (use template).
- Schedule with the scheduling czar.
- After you have delivered your group meeting edit your slides if needed.
- If applicable. submit your (corrected) handout to me to post them on the web-page.

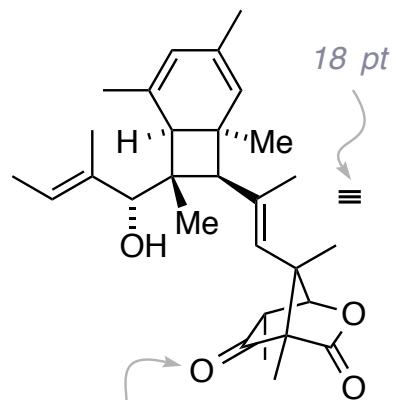
drawing area

Use the Trauner Presentation Template



rubicordifolin (**1**)

- 1) line spacing: 14 pts
- 2) *i*-Pr₂NEt, *t*-BuLi not *t*Bu
- 3) arrow extends conditions
- 4) not 4.
- 5) yield in brackets, centered (99%)



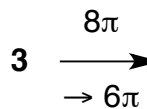
not reduced

XXa

dodecahedrane

in essence publication template x1.2 with thicker bonds

- 1) $h\nu$, Δ
- 2) *t*-BuLi, 78°C
- 3) **1**, *n*-BuLi, \rightarrow **2** (99%)



4

\xrightarrow{a}

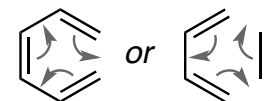
15

$\xrightarrow{b-f}$

[**99**]

\xrightarrow{g}

$h\nu$

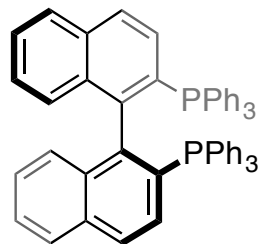
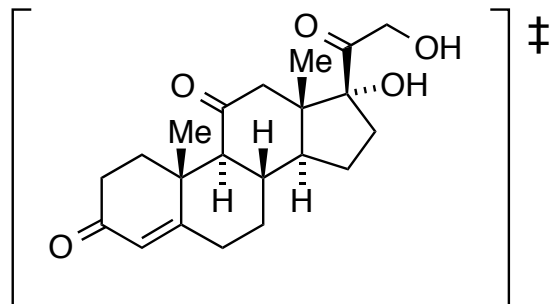
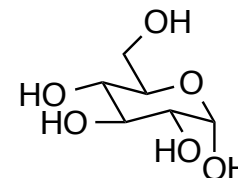


shade arrows in grey

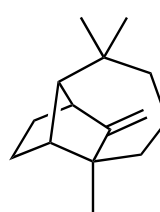
h

XX: R = H
XX': R = OH

Δ



16 pt



Our official font

San Serif: Helvetica (not Arial!)

Antiqua: Palatino

Special fonts: Symbol

Preparing a “Denksport”

- Use the corresponding ChemDraw template.
- Make a master (the key), then convert it into a problem with certain structures, reagents etc. removed. Add hints, spectral data, explain abbreviations etc. Add relevant citations in standard ACS format. Issue both the problem and then the key as hardcopies.
- Show a minimum of reagents and skip solvents and conditions unless they are crucial. Don't show yields unless they are remarkable. Don't show byproducts and isomers unless they can be recycled or we learn something about selectivity.
- Problems should be approachable both in a forward and in a retrosynthetic sense.
- Pick problems that are solvable and give enough hints. Questions during the session are encouraged but it is at the discretion of you, the presenter, whether and how to answer them.

Preparing a “Denksport”

- Mistakes occur and sometimes even increase the fun. However, it is your responsibility to correct these mistakes before the problem and the key are posted on the web.
- Edit the problems and the key, have them approved by Thomas Magauer and hand them to Frau Grilc to be posted on the web. Be aware that our “Denksports” are widely popular and should be professionally prepared in a unified format. Submit the original files and copies of papers to me or my secretary.
- Don’t start preparing the Denksport on the morning of the session.
- Be aware that “Denksport” is one of the most important educational tools of our group and is very important to our mission. Accordingly, it is continuously run even in my absence and during the “Semesterferien”. The roster will be managed by our “Scheduling Czar”.

Giving a presentation at a conference

- Suggest this to me.
- Available conferences include Gordon, Orchem, etc.
- Be prepared.
- Remember you are a representative of the group.
- Read Suslick's "Seminar on Seminars": <http://www.scs.uiuc.edu/suslick/seminaronseminars.html>.
- Tell us what you have learned.

Publishing

Authorship

Generally, we follows these guidelines (adapted from Peter Wipf's adaptation of Hanawalt, P. C., "Research collaborations: Trial, trust, and truth." *Cell* **2006**, 126, 823-825).

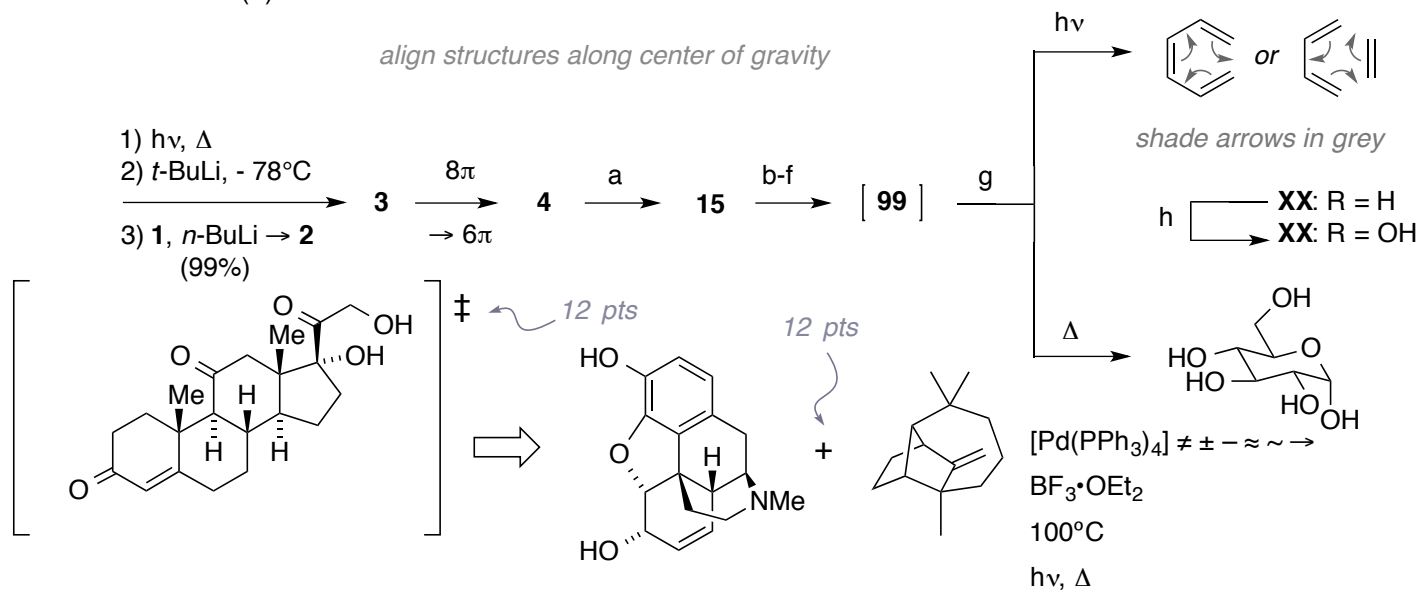
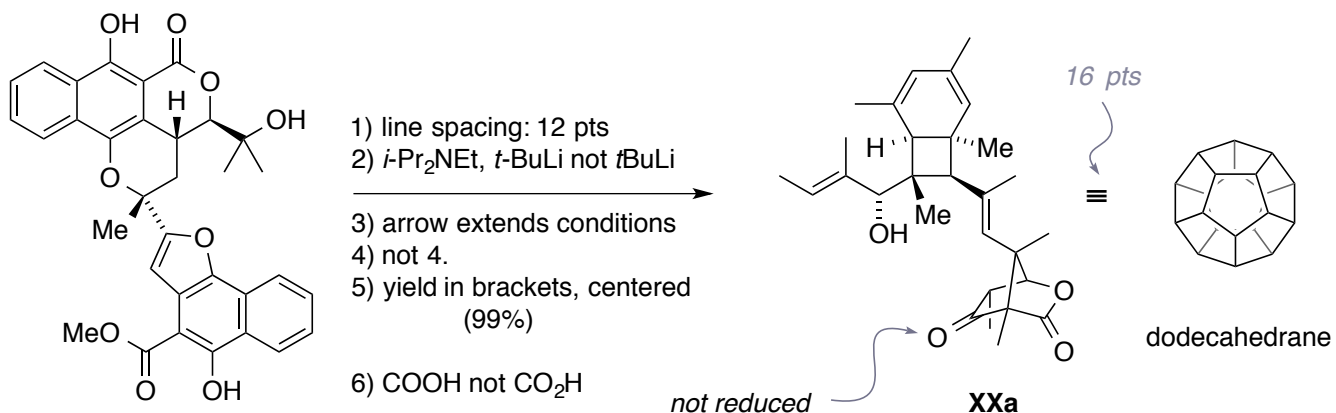
"Not everyone who contributes to a research project should necessarily be granted co-authorship on the resulting papers. Every listed author should have contributed substantially to the project with respect to its conception, the design and/or performance of the experiments, the analysis of the results, and/or the drafting of the manuscript describing the project. All authors (and especially students!) should participate in critical reading and approval of the final manuscript submitted for publication. Each author should understand the research problem and should be able to offer an intelligent discussion of the entire project from the perspective of their own involvement in it. There should never be any "courtesy authors," who may have been selected because of previous or future efforts in this research area or who are considered to add credibility or prestige to the publication. Those who provide services such as statistical advice or routine analytical/administrative support should not be granted authorship but can be thanked in the acknowledgments."

Authorship

- Alert me to interns, undergraduates etc. who should be co-authors or acknowledged. I cannot keep track of all of them.

Use the Trauner Publication Template

- This will be typically reduced to 60% (e.g. *ACIE*) or 75% (e.g. *Org. Lett.*)



Preparing a publication

- Your primary responsibilities are the experimental section and the citations. I will occasionally ask you to participate in writing the paper, pending on your level of experience. Use our publication template for graphics.
- Use a published high quality paper or a thesis as a sample for the experimental section (see required characterization). Check and double check and triple check your experimental data.
- Prepare publishable spectra (no solvent signals, paramagnetic impurities etc.), add structures and compound numbers at the end.
- Check and double check the compound numbers.
- Prepare CIF files for publication of X-ray structures in ACS journals and deposit X-ray data to the Cambridge Crystallographic Database (CCDC).
- Assemble an Endnote of Papers file for the citations.

Preparing a publication

- Always share the Word files and a Master-Chemdraw file, Powerpoint with figures etc with me. I need to be able to extract and manipulate these files.
- Provide current affiliations and addresses and e-mail addresses for all co-authors.
- Provide names, affiliations and e-mail addresses of potential reviewers.
- Familiarize yourself with Dropbox.
- I expect postdocs to provide advanced drafts of their papers.

Publication Checklist

- Always share the Word files and a Master-Chemdraw file, Powerpoint with figures etc with me. I need to be able to extract and manipulate these files.
- Provide current affiliations and addresses and e-mail addresses for all co-authors.
- Provide names, affiliations and e-mail addresses of potential reviewers.
- Familiarize yourself with Dropbox.
- I expect postdocs to provide advanced drafts of their papers.

Proofreading

- It's your primary responsibility.
- Don't rely on the galley proof to weed out mistakes.
- Assume that there are lots of mistakes, some of which have crept in during production.
- Check the numbers and consistency of structures [e.g. COOMe vs. COOEt].
- Check once starting with the second half of the proof to ensure full attention.
- Check the citations. People tend to get upset if they are not cited/spelled properly.
- Have at least 2 other colleagues check the galley proof.
- Don't assume that somebody else will catch the mistakes.
- Be especially careful with reagents/conditions, yields and other numbers.
- Make sure the proper people and agencies are acknowledged.

Moving on

Applying for postdoctoral fellowships

- Keep a list of laboratories you are interested in.
- Apply only for postdoctoral positions you are really excited about.
- Ideally apply for a postdoctoral position a year in advance.
- Meet potential advisors at conferences, as visitors etc.

Letters of recommendation

- Let me know if you need one well in advance.
- Provide a full list of addresses and recipients.
- Provide a CV and research summary.
- Fill out all the requisite forms as far as you can.
- I will occasionally ask you for a draft of the letter. e.g. for one of your undergraduates. Rest assured that I will edit it appropriately.
- I will not compromise the reputation of our group by recommending weak students or postdocs for jobs they are not qualified for.
- Be realistic in what you ask me for.

Checking out

- Fill out the “Laufzettel” for the department (reg. keys, books, access cards etc.).
- Submit your final report / thesis both in an electronic format and as a hard-bound copy.
- Clean out your workspace.
- Hand over compounds in vials (not flasks) to assigned successors or Martin. Make sure they are numbered properly and can be identified from your report/thesis. Indicate amount, sensitivity etc. Only chemicals that will be needed in future work or have not yet been published should be left behind. Storage space is designated in a fridge/the storage room.
- Do not leave any other chemicals behind. I will not sign off on your thesis otherwise or provide (further) letters of recommendation if you leave a mess.
- Deposit an your electronic notebooks and spectra on our group server.
- Hand over physical copies of your lab-notebook to Carrie to be deposited in the archive room.
- Schedule an exit talk to the group.
- Schedule an exit appointment with Prof. Trauner to discuss continuation of the project etc. Suggest a person to take over the project, if applicable.
- Provide a forwarding address.

Last but not least

A word on total synthesis

Some syntheses progress nicely over the years, whereas others limp along until everything happens within a couple weeks. Generally, progress is not linear in total synthesis. If you cannot deal with “delayed gratification” and long stretches of frustration should not work on a total synthesis.

However, you also must retain the ability to cherish those small steps toward your goal: a beautiful chromatographic separation, a clean spectrum, nice crystals or the structural elucidation of a complex byproduct.

Total synthesis is not like some methodology project where, if it works, you can fill in a table with commercially available substrates. “Bringing up material” is an important part of the game and must be carefully planned and orchestrated. Generally, you should run one “logistics reaction” and one “frontline reaction” each working day. You will only be successful in total synthesis if you are willing to put the long hours required to set these up and analyze the result in a professional manner.

"Success is the ability to go from one failure to another with no loss of enthusiasm." Winston Churchill

"The difference between persistence and stubbornness is success." Samuel J. Danishefsky

“Activity Drives Discovery”

A word on taking vacations, attending conferences

You can attend a meeting as soon as you have something to talk about. In the end, you will only be measured by your success in the laboratory and by your publications. Presenting to your fellow scientists is important but you need to have a good story to present. Careers are made in the lab (typically after 6 PM). It is important that you don't waste your time with distractions. As you get older you will realize that time is a very precious resource and that 3-4 years run by quickly.

You will notice that your whole interaction with your supervisor will get much more enjoyable and relaxed once you have something under your belt. This is why you should put in a lot of effort into the initial phases of your project and postpone that major family vacation or the Grand Tour through Central Europe to a later stage of your graduate or postdoctoral career.

It takes so little effort to make a good first impression. Just do a bit more than what is expected!

Ten pet peeves of your supervisor

"I don't have pet peeves...I have major, psychotic hatreds." George Carlin

- Talking yourselves out of running experiments
- Low hood/rig to desk ratio
- Residual solvent signals in your spectrum
- Messy, corroded balances and broken pumps
- Undetermined yields
- Unlabeled chemicals, reagents etc.
- Incomplete, disorganized records and poorly kept notebooks.
- Chemical graveyards in freezers and elsewhere
- Claims that are not backed up by data
- Asking me for a vacation shortly after you joined the group or after a holiday break
- Excuses

Seven features of a Great Student

Intelligence

Commitment

Curiosity

Organization

Patience

Passion

Courage