

*A flipped learning
exercise for 3rd
semester Pharmacy
students*

Comparative Anatomy – from
Experimental Animal to Human

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Flipped learning – The student becomes the teacher

In the flipped class-room, it is the students who are responsible for acquiring knowledge and delivering information to the teacher.

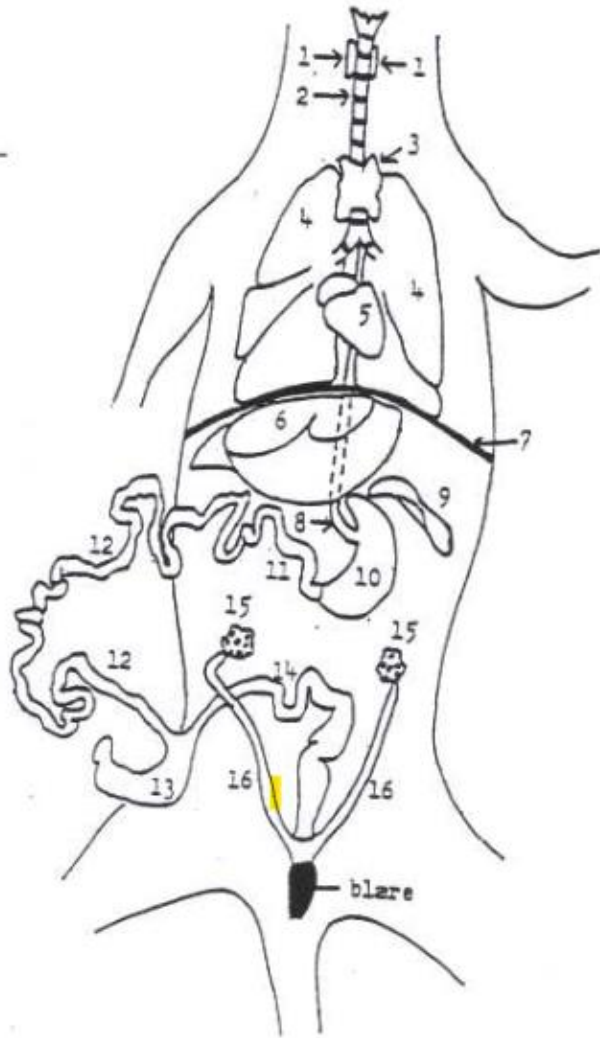
Thus the actual meeting with the teacher becomes interactive, through presentation of knowledge and discussion.

This requires self-directed and active learning from the students.

Problem: Designing a new sustainable, ethical costs-effective anatomy exercise

What do students want?

And how do students learn (on all solo taxonomy levels)?



- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Laboratory exercise A protocol ' Rat dissection',
Basal Farmakologi, 3rd semester Pharmacy education

What do our students want?

- **Visible goals, learning outcomes** – clear communication, framework and feedback between teacher and student
- **“The red thread”**– more coherence between courses, topics and activities of the individual courses
- **Active participation** – interactive lectures, self-studies, project work, class tutorials and problem-solving

What do we know works?

‘Teaching for quality learning at University, 4th edition’ John Biggs og Catherine Tang



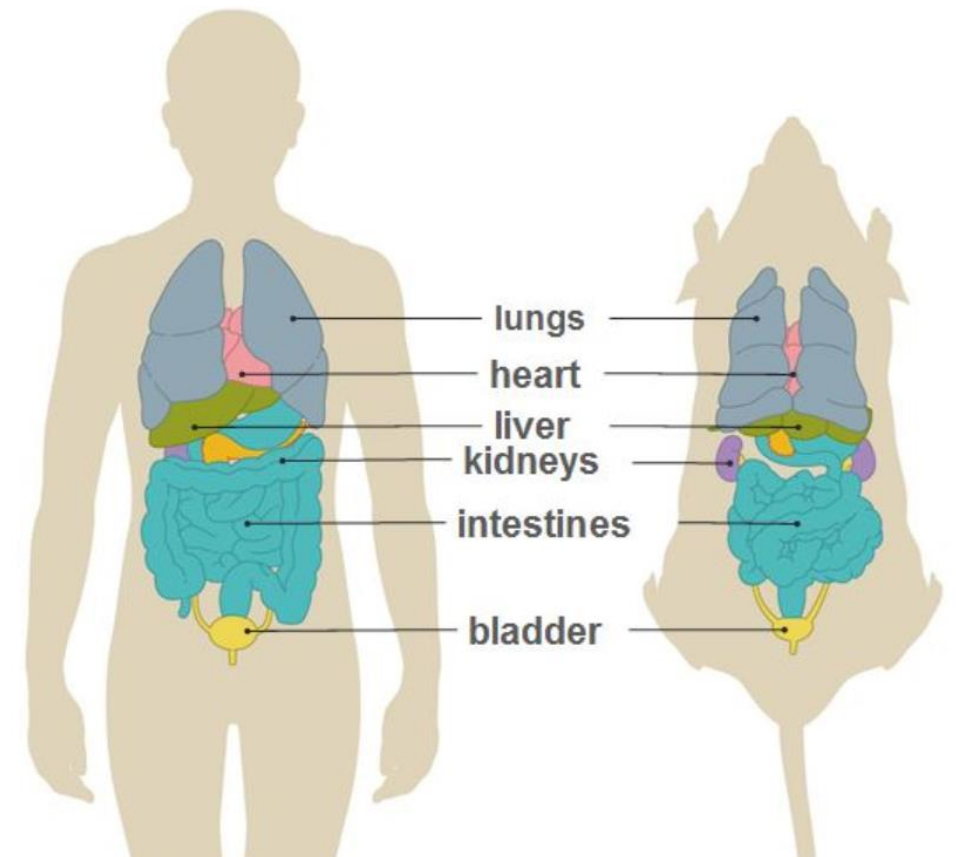
John Hattie made a synthesis of 800 studies

- **Hattie J. (2013) “Understanding learning: Lessons for learning, teaching and research”**
- **Hattie J. (2011) Chapter 8: Which Strategies Best Enhance Teaching and Learning in Higher Education?. “Empirical research in Teaching and Learning: Contributions from Social Psychology”**

- **‘Visible learning’** – 3 important factors: Clear Indented Learning Outcomes and Success criteria, giving and seeking feedback, teaching-learning strategies emphasizing student self-directed learning
- **Constructive Alignment** – All course-elements and assessment support the intended learning outcomes ‘
- **‘Student-Centered learning’** – Active learning, activities that demand self-regulated learning

Overall intended learning outcomes of the exercise

- The students should know the main organs of the human body, understand their anatomy (structure and placement) and function
- Be able to compare human anatomy to that of the experimental animal, the rat (how is the rat similar or different?)

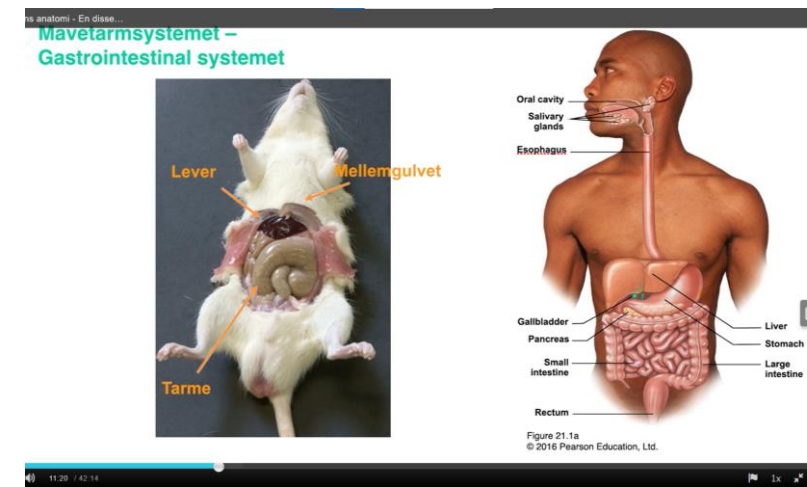


The practical framework of the exercise

The students have to watch a 40 minute 'documentary' movie of a rat dissection and comparison to human anatomy at home prior to the exercise.

The exercise lasts 2 hours at the human macroscopic anatomy hall (Panum):

- First hour: In groups of 3 finding the 9 organ systems from the movie + noting their main functions in Padlet
- Second hour: Group presentations and discussion



'Komparativ anatomi-gennemgang - fra forsøgsdyr til menneske'

NB! Inden denne øvelse skal I have set filmen 'Kroppens Anatomi - En dissektion af rottekroppen' og 'Hjernens Anatomi - En dissektion af rottehjernen'. I finder filmene på Absalon Hjemmesiden for Basal Farmakologi på [Eksellessiden](#) under linket til protokolten eller under 'Media Gallery'.

I skal bruge den video, I har fået fra filmen til at kigge på menneskets organer. Rotten er et af de mest hyppigt brugte forsøgsdyr til udviklingen af lægemiddelstoffer og har de samme organsystemer som mennesket, derfor er den et godt udgangspunkt for forståelsen af vores anatomi.

I grupper af tre, skal I på 'organkattejagt' på Panums 'ør makroskopisk studiecæl'. Her skal I finde eksempler på de enkelte af kroppens centrale organer:

- Mave-tarm-systemets dele
- Mil
- Nyre
- Blinre
- Lever
- Skjoldbruskkirtel
- Lunge
- Hjerne

Husk at tage et kig på hjernen - Til de skarpe skattejagere med tid til det, prøv at finde følgende hjernestrukturer:

- Cerebellum
- Cerebralt cortex
- Hjernestammen (Pons og Medulla Oblongata)
- Midelhjernen
- Hypofysen og hypothalamus

Når I har fundet organet skal I gå ind i padlet og lave et opslag med Jeres 'organ-fund', her skal I notere fig. for det enkelte organ:

- Organets reolnummer og præparatnummer (I skal give et kort overblik)
- Organets centrale funktioner på punktform (I skal give et kort overblik)

Padlet linket: <https://padlet.com/annaklavonn/k3ic6g99867dhy>

Dette udgår Jeres rapport/aflevering til øvelsen.

Efter skattejagten samles vi kort og gennemgår svarene sammen ved organerne, hver gruppe udvælges af instruktøren til at præsentere mindst et af deres fund.

God jagt,
Sofie & Anna

'Komparativ anatomi-gennemgang - fra forsøgsdyr til menneske'

Lav et opslag for jeres gruppe med gruppenavnet som titel.

I opslaget skriver I reolnummer-nummer og præparat-nummer for det enkelte organ, og på punktform dets centrale funktioner.

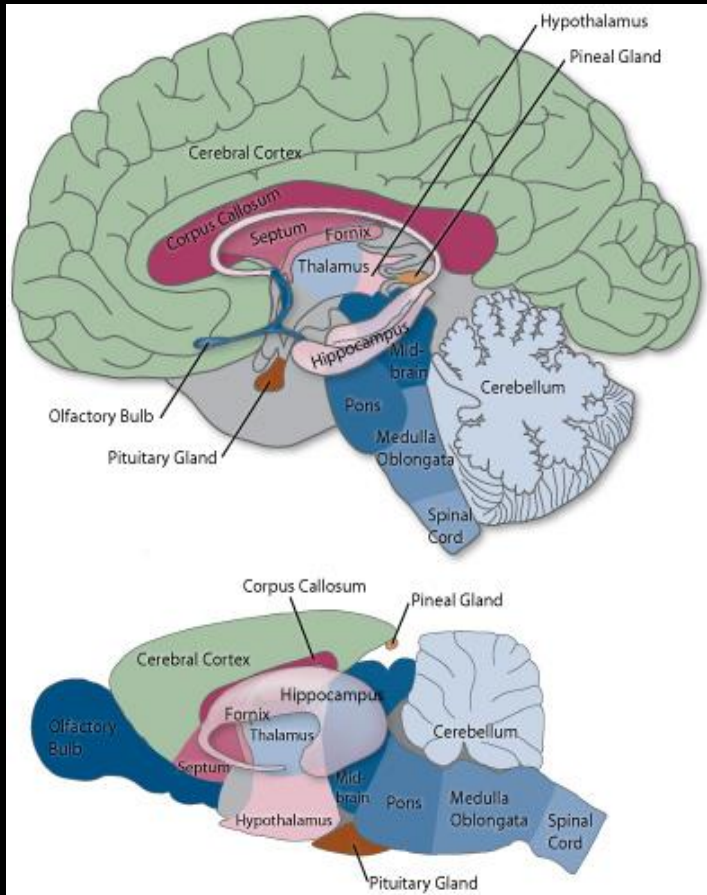
Det skal gøres for alle organerne I har fundet på jeres skattejagt.

Gruppe 4	Gruppe 6	Eksempel Gruppe #
<p>Mave-tarm systemet Præparat nr. 176 side 1, montage 11</p> <ol style="list-style-type: none"> 1. Fordøjelsen (nedbrydning af føde) 2. Optager næringsstoffer fra mæden til kroppen <p>Pancreas Præparat nr 138 side 1, montage 12</p> <ol style="list-style-type: none"> 1. Danner enzymer til nedbrydning af mad i tarmene. 2. Laver insulin. <p>Milt Præparat nr 333 og 260, montage 11</p> <ol style="list-style-type: none"> 1. Filtrerer/reenser blodet 2. Hjælper immunforsvaret <p>Nyre Præparat nr 261, montage 12</p>	<p>Mave-tarm-systemet: Mave-tarm-systemets dele: reol 11, præparat 181 - mavesæk (reol 11, præparat 262), tyndtarm, blindtarm (præparat 337), tyktarm (præparat 235) - overordnede funktioner: nedbryder mæden med enzymer, fordøjer mæden, optager næringsstoffer, danner facies. - Pancreas: reol 10, præparat 281 (3 blå stifter), funktion: frigiver fordøjelsesenzymer og insulin - Milt: reol 11, præparat 260, funktion: en del af immunsystemet, sekundær lymfævæ (opbevarer modne immunoceller) - Nyre: reol 12, præparat 261, funktion: filtrer blodet, regulerer kroppens væske og saltbalance (reol 12)</p>	<p>Mave-tarm-systemet Reol #, præparat # - Funktion 1 - Funktion 2 - Funktion 3 Pancreas/hypofyserkirtel reol#, præparat # - Funktion 1 - Funktion 2 etc</p>

An example from a rat brain dissection

- The ventricular system

Important points: Alignment with syllabus – Figures from the book 'Human Physiology an Integrated Approach' 9th edition Silverthorn



Visible learning

Clear Indented Learning Outcomes and Success Criteria

- **Announcement in Absalon** with clear guidelines and expectations: Read the protocol and watch the movies!
- **The protocol explains the exercise:** In groups of three the students have to find the 9 organs from the list and note their structure and functions, then each group will present.
- **Introduction on the day: Have you watched the movie?** It is pivotal to refer back to the movie: 'You find the answers to the organ structure and functions in the movie'.

Student self-directed learning:

- **Flipped learning:** Watching the movie, finding the organs and filling out the padlet answers and presenting

Giving and seeking feedback:

- **Visible assessment:** Each group uploads the organ examples (shelf, specimen #) and functions in padlet (Important: Each group is picked at random).
- **Group presentations and interactions,** the teacher guides the discussion to reach all learning outcomes on all taxonomic levels.

NB! Constructively aligned with the course syllabus

And the movies were made available on the following Absalon Pharmacology course-pages:
Systemfarmakologi
and Organfarmakologi



Do's and Don'ts

Get feedback on the movie before publishing it!

A movie is permanent, if you make a mistake it is there forever

Repeat the concept of flipped learning multiple times! Be clear that it is part of the syllabus, the same way as the books.

It may seem logical to the teacher, but students do not naturally take the information from the movie and use it (they go to google, ChatGPT, Wikipedia)

Create a safe learning environment

“View the exercise as a study-group, you are allowed to try and fail – we are here to learn.”

The positive experience: Padlet enables the teacher to select the groups that got the right answers.

Thank you! Questions?

