

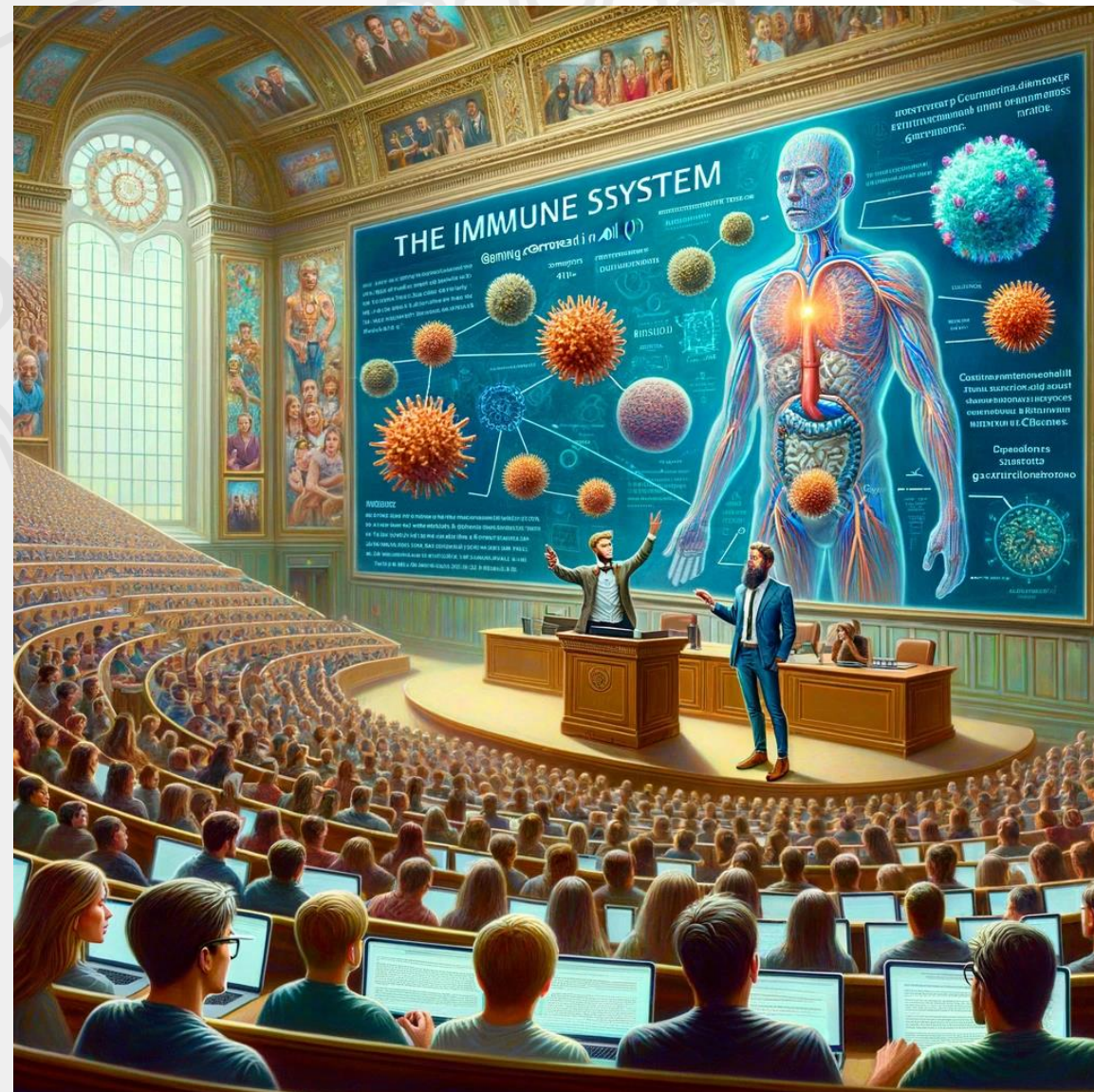
ChatGPT for teaching purposes

November 16th

Make a difference conference

Martin Kongsbak-Wismann, Associate Professor
Jan Pravsgaard Christensen, Professor

KØBENHAVNS UNIVERSITET



Who are we?

- **Martin Kongsbak-Wismann**, Associate Professor
- **Jan Pravsgaard Christensen**, Professor

Teach medical students, 5th semester

- Lectures
- SAU (classroom teaching)
- Question hours

- When did we encounter ChatGPT for the first time

SUMMERSCHOOL 2023
15. - 18. AUGUST

FOUR DAYS OF INSPIRATION



Dept. of Immunology and Microbiology



Disclaimer!

- We are not experts in the theory and technical features underlying large language models.
- But we have used it for 3 months now relatively extensively, so by now we do have a lot of hands-on experience
- How many in the audience have used ChatGPT?

SUMMERSCHOOL 2023
15. - 18. AUGUST

FOUR DAYS OF INSPIRATION



Topic of today

“Jan and Martin have adopted **ChatGPT** as an innovative tool for generating **multiple choice questions in immunology for medical students** (5th semester). They will share their approach and illustrate the **relative small effort** it took to get a good draft to work with.

Furthermore, while the AI offers to quickly generate a diverse range of rigorous questions, they have also **identified areas where ChatGPT falls short**. Eager to provide insights, they emphasize the opportunities for other educators, but also to approach the technology with a discerning eye, ensuring that its outputs align with academic standards and course objectives.”

ChatGPT

MK

I have just started using chatgpt with a coworker. We are associate and full professor at the university of Copenhagen, respectively. We use it for generating multiple choice questions for medical students, having to learn about immunology.

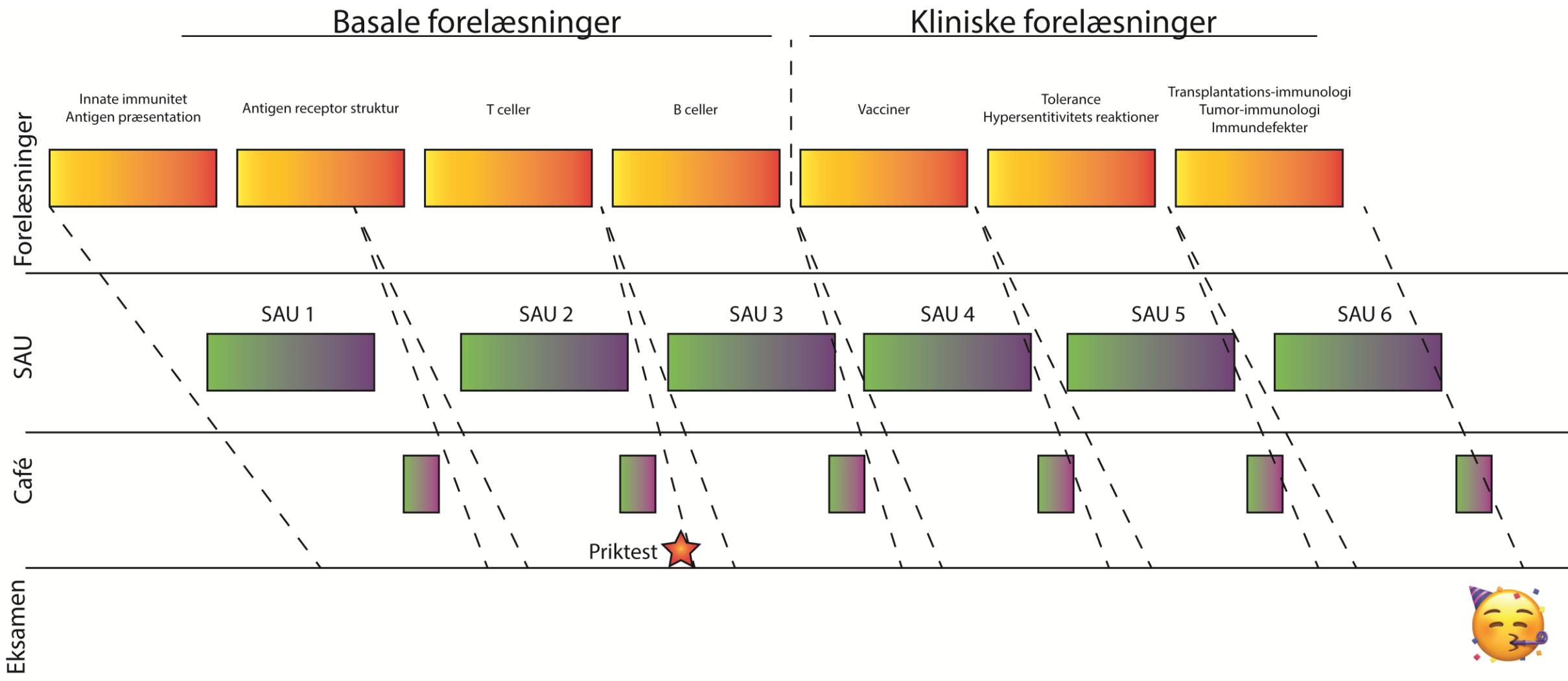
The sentences should describe how we utilize chatgpt in this instance

Also mention in the texts that we have found areas where chatgpt falls short, and we want to emphasize what other teachers should be aware of

“Jan and Martin have adopted **ChatGPT** as an innovative tool for generating **multiple choice questions in immunology for medical students** (5th semester). They will share their approach and illustrate the **relative small effort** it took to get a good draft to work with.

Furthermore, while the AI offers to quickly generate a diverse range of rigorous questions, they have also **identified areas where ChatGPT falls short**. Eager to provide insights, they emphasize the opportunities for other educators, but also to approach the technology with a discerning eye, ensuring that its outputs align with academic standards and course objectives.”

Course overview for "Immunology" 5th semester



Exam

Multiple choice and essay questions

Essay

We give the student 10-15 "essay" assignment of different length, the **bold** word aid the students to understand how much text we anticipate from them.

An example:

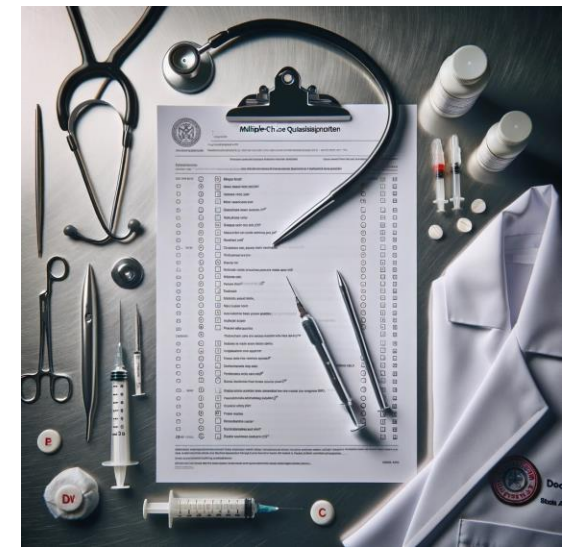
- 1) **Specificitet og diversitet.** Specificitet og diversitet er to vigtige træk ved immunsystemet, som spiller en fundamental rolle for forståelsen af innat og adaptiv immunitet.
 - a) **Definer** kort begreberne specificitet og diversitet i en immunologisk sammenhæng.
 - b) **Diskuter** hvordan specificitet og diversitet etableres i det adaptive immunsystem og betydningen heraf (hint: *inkluder betragtninger omkring hvilke celler der udtrykker disse receptorer; de gener der er involveret; de genetiske mekanismer der ligger bag skabelsen af receptor-repertoiret; den cellulære fordeling af receptorerne; og betydningen af disse forhold for immunsystemets responser*).
 - c) **Redegør** for den rolle specificitet og diversitet spiller i det innate immunsystem (gerne med sammenligninger til det adaptive immunsystem).

We give the student 25 MC questions, only one right answer for each question.

An example:

Hvilken af følgende sygdomme/syndromer involverer en type IV hypersensitivitetsreaktion?

1. Serumsyge
2. Graves' sygdom
3. Goodpasture's syndrom
4. **Insulin-afhængig diabetes mellitus**
5. Høfeber



We wanted to make more multiple choice questions available for students during the course, so they could self-test

- Multiple choice questions are available through the curriculum-book, but it is available in english

- Translation in ChatGPT

Correct

CR2-koreceptor

Isotype skift

Humoralt respons

Hans morbror/onkel

Krydsbinding

Wrong

CR2-kernekebemanden

isotipo skift

humoristisk respons

Hans materielle onkel

Tværbinding

Den/det, en/et is mixed up, and many interposed phrases.

- Much better and faster than google translate, but it needs to be corrected for grammatical errors afterwards

ChatGPT – how does it work?

- You need a prompt, which is just a fancy word for a request

Instruction: You are an expert in quizzes, and I could use some help creating a good multiple choice quiz questions for students on the **5th semester** of studying to become **medical doctors** at a university.

Central topic: **Immune system**

Instructions: This quiz should contain **1 question**, based on the “Quiz content” section below.

Question: Create a multiple choice question that is clear and precise.

Quiz Content: **Vaccination**

Answer Options: For question made, provide **5 plausible answer options**. Ensure that there is only one correct answer and that false answers are plausible but incorrect.

Feedback: **Provide feedback for all the answer options**, also the incorrect ones. The feedback should assist the students in understanding why the correct answer is right, but also why the wrong answers are wrong, in order to provide additional information to enhance their learning. Both the feedback to the correct and incorrect answers needs to be elaborate, using 2 sentences.



Prompt is pasted into ChatGPT

MK

Instruction: You are an expert in quizzes, and I could use some help creating a good multiple choice quiz questions for students on the 5th semester of studying to become medical doctors at a university.

Central topic: Immune system

Instructions: This quiz should contain 5 short question, based on the "Quiz content" section below.

Question: Create a multiple choice question that is clear and precise.

Quiz Content: Vaccination

Answer Options: For question made, provide 5 plausible answer options. Ensure that there is only one correct answer and that false answers are plausible but incorrect.

Feedback: Provide feedback for all the answer options, also the incorrect ones. The feedback should assist the students in understanding why the correct answer is right, but also why the wrong answers are wrong, in order to provide additional information to enhance their learning. Both the feedback to the correct and incorrect answers needs to be elaborate, using 2 sentences.



ChatGPT's return to the prompt:



Question 1: Which type of immunity is directly established by vaccination?

- A) Passive natural immunity
- B) Passive artificial immunity
- C) Active natural immunity
- D) Active artificial immunity
- E) Innate immunity

Feedback:

- A) Incorrect. Passive natural immunity is acquired through the transfer of antibodies from the mother to the fetus, not through vaccination.
- B) Incorrect. Passive artificial immunity involves the direct transfer of antibodies from one person or animal to another, not the stimulation of an individual's own immune system as in vaccination.
- C) Incorrect. Active natural immunity results from an infection, not from vaccination.
- D) Correct! Active artificial immunity is established by vaccination, stimulating the individual's immune system to produce specific antibodies and memory cells.
- E) Incorrect. Innate immunity is a general and non-specific form of defense that is present at birth, not established by vaccination.

Not precise enough (it also happens after birth with antibodies from mother to child through breast milk)



ChatGPT translation



Spørgsmål 1: Hvilken type immunitet etableres direkte gennem vaccination?

- A) Passiv naturlig immunitet
- B) Passiv kunstig immunitet
- C) Aktiv naturlig immunitet
- D) Aktiv kunstig immunitet
- E) Medfødt immunitet

Feedback:

A) Forkert. Passiv naturlig immunitet opnås gennem overførsel af antistoffer fra mor til foster, ikke gennem vaccination.

B) Forkert. Passiv kunstig immunitet indebærer direkte overførsel af antistoffer fra én person eller et dyr til en anden, ikke stimulering af en individuals eget immunsystem som ved vaccination.

C) Forkert. Aktiv naturlig immunitet resulterer fra en infektion, ikke fra vaccination.

D) Korrekt! Aktiv kunstig immunitet etableres ved vaccination og stimulerer individets immunsystem til at producere specifikke antistoffer og hukommelsesceller.

E) Forkert. Medfødt immunitet er en generel og uspecifik form for forsvar, der er til stede ved fødslen, ikke etableret ved vaccination.

Translations are not 100% accurate



How fast is this AI generation actually?

Instruction: You are an expert in quizzes, and I could use some help creating a good multiple choice quiz questions for students on the **5th semester** of studying to become **medical doctors** at a university.

Central topic: **Immune system**

Instructions: This quiz should contain **1 short question**, based on the “Quiz content” section below.

Question: Create a multiple choice question that is clear and precise.

Quiz Content: **Vaccination**

Answer Options: For question made, provide 5 plausible answer options. Ensure that there is only one correct answer and that false answers are plausible but incorrect.

Feedback: Provide feedback for all the answer options, also the incorrect ones. The feedback should assist the students in understanding why the correct answer is right, but also why the wrong answers are wrong, in order to provide additional information to enhance their learning. Both the feedback to the correct and incorrect answers needs to be elaborate, using 2 sentences.



Use the multiple choice questions directly in sendsteps for classroom teaching or lectures

3. Hvilken/hvilke initielle typer af reaktioner leder aktiveringen af det innate immunforsvar til?

- A. Inflammation
- B. Produktion af antistoffer
- C. Hypersensitivitets-reaktioner
- D. Både A og E er rigtige
- E. Antiviralt stadie

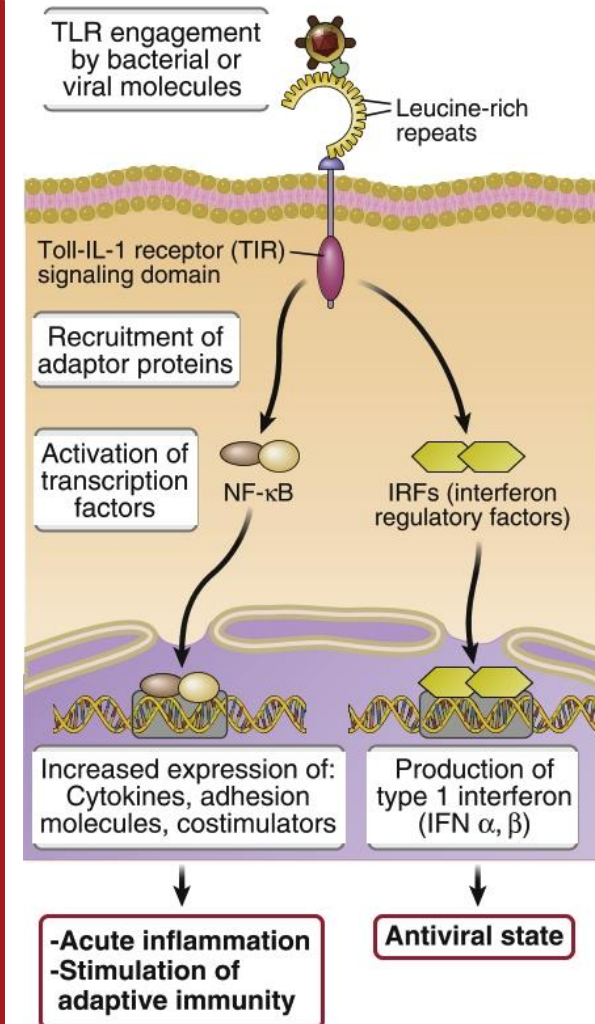
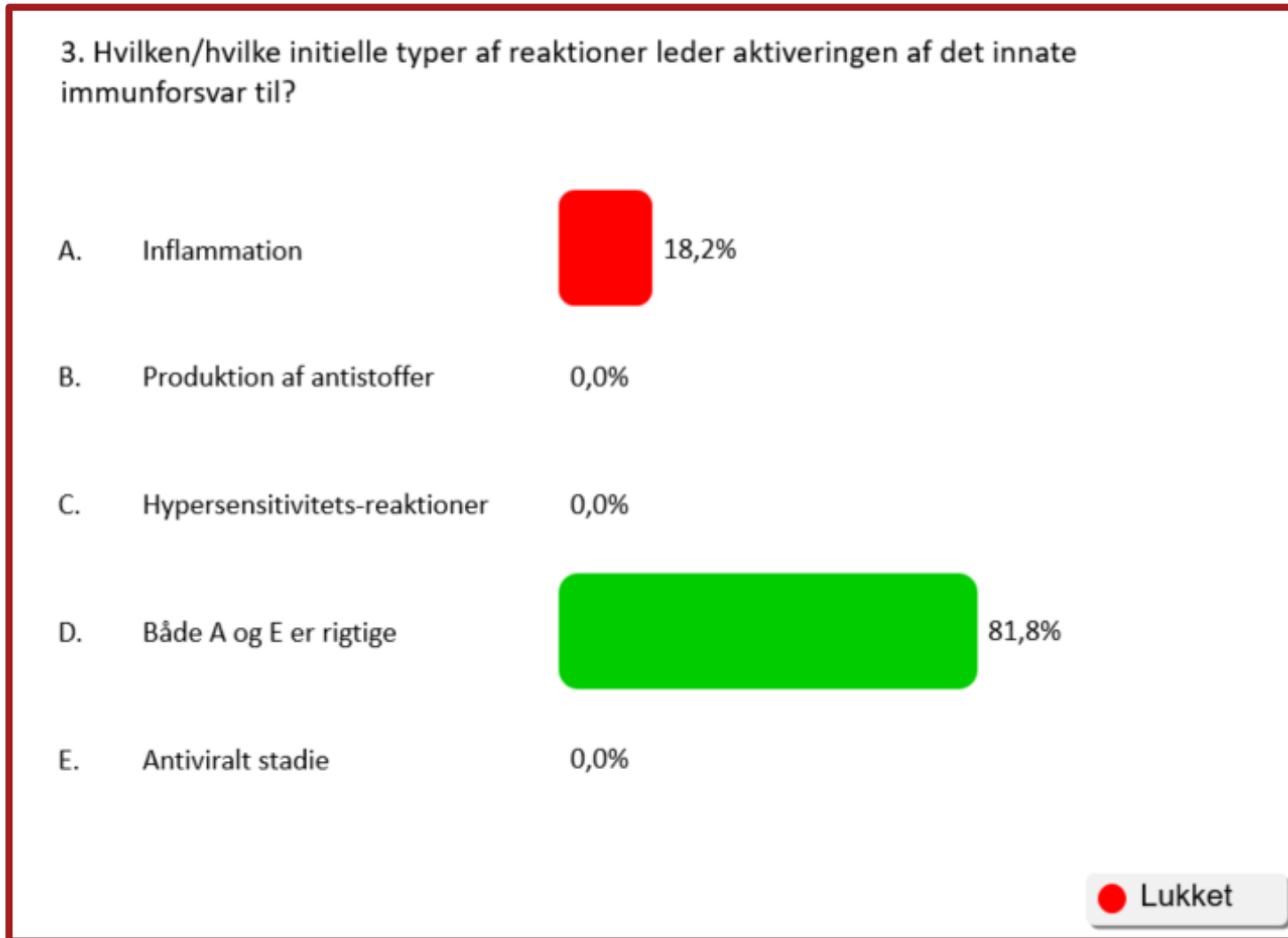
Spørgsmålet vil være tilgængeligt
når du starter din session og
præsentation

● Lukket












This gives the students and the teacher instant feedback on whether the subject has been understood


It also provides the possibility to add figures for follow-up explanations to the questions



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What have we been generating so far

Selv test efter hvert kapitel		✓	+	⋮
⋮	 Kapitel 1 41 pts	✓		⋮
⋮	 Kapitel 2 35 pts	✓		⋮
⋮	 Kapitel 3 27 pts	✓		⋮
⋮	 Kapitel 4 24 pts	✓		⋮
⋮	 Kapitel 5 36 pts	✓		⋮
⋮	 Kapitel 6 33 pts	✓		⋮
⋮	 Kapitel 7 40 pts	✓		⋮
⋮	 Kapitel 8 33 pts	✓		⋮
⋮	 Kapitel 9 33 pts	✓		⋮

Test eksamen		✓	+	⋮
⋮	 Quiz til test før eksamen 25 pts	✓		⋮

MC questions for each chapter

We generate/translate app 40 question for each chapter in the book.

So far we have generated 345 questions for the self test, either by translating or generating question, and still work on it.

MC questions for test examine

We generated a test bank of 130 question from all over the book.

Each time the student "ask" for a test 25 random questions are pulled from the test bank.

How do the students get access to it through absalon?

Title


Kapitel 1

Instructions

Denne test er ment som en hjælp til dig. Du vil nu blive præsenteret for en række spørgsmål, alle relateret til kapitel 1 i lærebogen. Nogle er lidt sværere nogle måske nemme nok men de tjener alle til at få dig til at tænke over dele af emnet og give dig et indblik i din nuværende viden.

Når testen er færdig vil du få feedback på hvert spørgsmål så selv om du ikke kan svare på spørgsmålet kan du lære noget.

Feedback vil også være andel korrekte svar og antal point. Her bliver der ikke fratrukket point for forkert svar, men husk det er tilfældet ved eksamen. Andel korrekte svar giver måske det bedste billede af din nuværende viden.

1 - 41  Abbas 6ed og Evolve 5ed Kap1

All questions pulled from bank: Abbas 6ed og Evolve 5ed Kap1
1 point per question

1 1/1 point

Hvad er hovedfunktionen af cytotoxiske T-celler?

Produktion af antistoffer

Drab af inficerede celler

Forstærkning af inflammation

Undertrykkelse af immunrespons

Genkendelse af patogen-associerede mønstre

Feedback

General Feedback

Cytotoksiske T-celler, også kendt som CD8⁺ T-celler, er primært ansvarlige for at identificere og eliminere inficerede celler gennem direkte celledrab. De spiller en afgørende rolle i celle-medieret immunrespons.

Antistofproduktion er en funktion af B-celler, ikke cytotoxiske T-celler.

Undertrykkelse af immunrespons er en funktion af regulatoriske T-celler, ikke cytotoxiske T-celler.

Genkendelse af patogen-associerede mønstre (pathogen associated molecular patterns, PAMP) er en funktion af mønstergenkendelsesreceptorer (Pattern Recognition Receptors, PRR), der ikke i udbredt grad er udtrykt af cytotoxiske T-celler.

Forstærkning af inflammation er ikke en primær rolle for cytotoxiske T-celler.

Kapitel 1

Denne test er ment som en hjælp til dig. Du vil nu blive præsenteret for en række spørgsmål, alle relateret til kapitel 1 i lærebogen. Nogle er lidt sværere nogle måske nemme nok men de tjener alle til at få dig til at tænke over dele af emnet og give dig et indblik i din nuværende viden.

Når testen er færdig vil du få feedback på hvert spørgsmål så selv om du ikke kan svare på spørgsmålet kan du lære noget.

Feedback vil også være andel korrekte svar og antal point. Her bliver der ikke fratrukket point for forkert svar, men husk det er tilfældet ved eksamen. Andel korrekte svar giver måske det bedste billede af din nuværende viden.

1 1 point

Hvilken type immunitet opnås gennem vaccination?

Inflammatorisk immunitet

Cellemedieret immunitet

Medfødt immunitet

Aktiv immunitet

Passiv immunitet

[Clear my selection](#)

Next

5 0/1 point

Hvad er hovedfunktionen af regulatoriske T-celler?

Angreb af inficerede celler

Aktivering af komplementproteiner

Forstærkning af inflammation

Produktion af antistoffer

Undertrykkelse af immunrespons

Feedback

General Feedback

Regulatoriske T-celler, også kendt som Tregs, spiller en afgørende rolle i at opretholde immun tolerance og forhindre overdrevne immunrespons. De undertrykker aktiviteten af andre immunceller og forhindrer herved til en hvis grad autoimmune reaktioner.

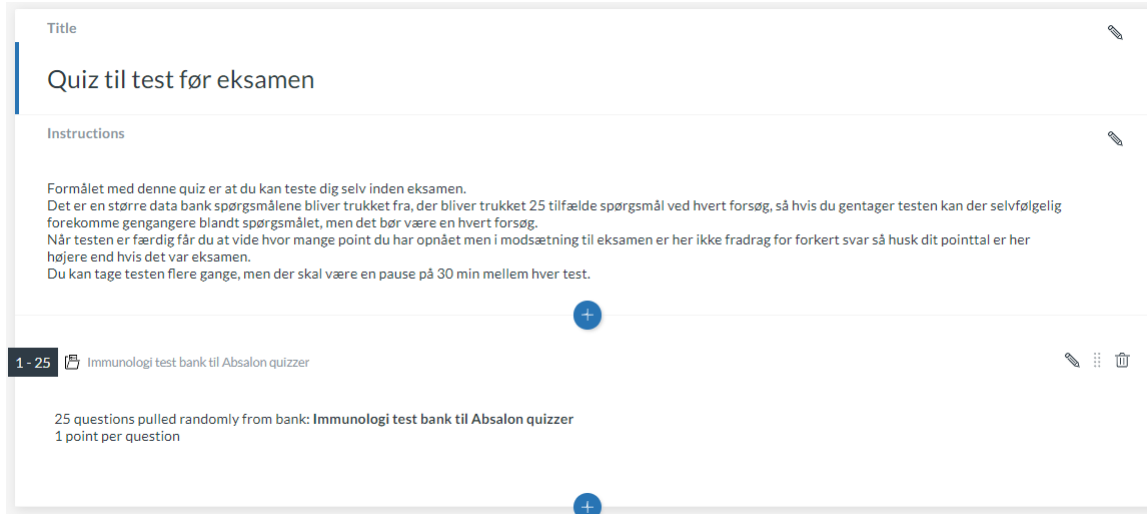
Regulatoriske T-celler er ikke primært involveret i produktionen af antistoffer; denne rolle varetages af andre T celler og B-celler.

Forstærkning af inflammation er ikke en funktion af regulatoriske T-celler; de har en antiinflammatorisk rolle.

Angreb på inficerede celler er en funktion af cytotoksiske T-celler og NK celler, men ikke regulatoriske T-celler.

Aktivering af komplementproteiner er ikke en primær rolle for regulatoriske T-celler.

How do the students get access to it through absalon?



Title

Quiz til test før eksamen

Instructions

Formålet med denne quiz er at du kan teste dig selv inden eksamen.
Det er en større data bank spørgsmålene bliver trukket fra, der bliver trukket 25 tilfældige spørgsmål ved hvert forsøg, så hvis du gentager testen kan der selvfølgelig forekomme gengangere blandt spørgsmålene, men det bør være en hvert forsøg.
Når testen er færdig får du at vide hvor mange point du har opnået men i modsætning til eksamen er her ikke fradrag for forkert svar så husk dit pointtal er her højere end hvis det var eksamen.
Du kan tage testen flere gange, men der skal være en pause på 30 min mellem hver test.

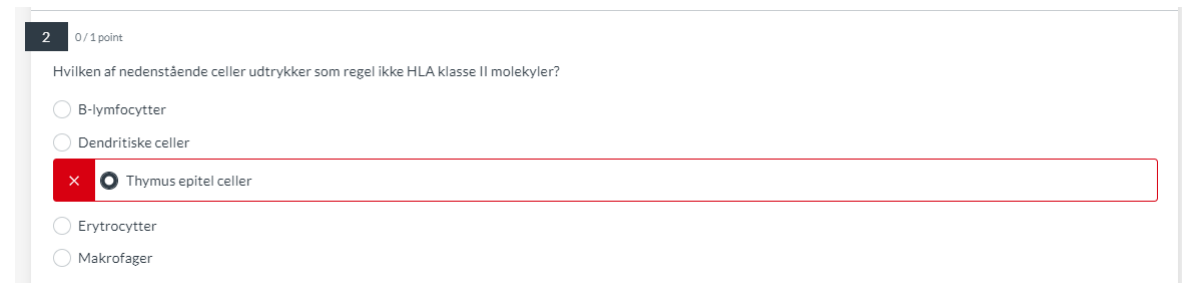
1-25 Immunologi test bank til Absalon quizzer

25 questions pulled randomly from bank: Immunologi test bank til Absalon quizzer
1 point per question

MC questions for test examine

We generated a test bank of 130 question from all over the book.

- Each time the student “ask” for a test, 25 random questions are pulled from the test bank.
- The question and the order of the answers are in random order.
- Each new request will result in a “new” test.
- Grading will only be correct answers out of 25, there is no feedback.



2 0 / 1 point

Hvilken af nedenstående celler udtrykker som regel ikke HLA klasse II molekyler?

B-lymfocytter

Dendritiske celler

Thymus epitel celler

Erytrocytter

Makrofager

Live demo – we need a volunteer 😊

Instruction: You are an expert in quizzes, and I could use some help creating a good multiple choice quiz questions for students on the **2th semester** of studying to become **medical doctors** at a university.

Central topic: **Genetics**

Instructions: This quiz should contain **1 short question**, based on the “Quiz content” section below.

Question: Create a multiple choice question that is clear and precise.

Quiz Content: **Downs syndrome**

Answer Options: For question made, provide 5 plausible answer options. Ensure that there is only one correct answer and that false answers are plausible but incorrect.

Feedback: Provide feedback for all the answer options, also the incorrect ones. The feedback should assist the students in understanding why the correct answer is right, but also why the wrong answers are wrong, in order to provide additional information to enhance their learning. Both the feedback to the correct and incorrect answers needs to be elaborate, using 2 sentences.

TAKE HOME MESSAGES

Pros

- It saves you time since it can aid you in being creative and give you inspiration
- It is easy accessible, as it does not require you have any knowledge in programming. You just "talk" to it in everyday language (also a possibility for dictating to it)
- It can also create graphical illustrations, which although illustrative, are NOT scientifically accurate (ChatGPT 4.0).
- It can now includes a searching tool so it can also access pubmed and abstracts (and also full text in OpenAccess articles).

Cons

- You need to know the theory, so you can be critical about the output.
- It excels in simple theory, but when it gets complex and complicated it begins to fall short
- Translations are much faster than google translate, but it still takes wuite some time to correct grammatically
- ChatGPT 4.0 is in our experience better than ChatGPT 3.5, but it cost 25\$/month



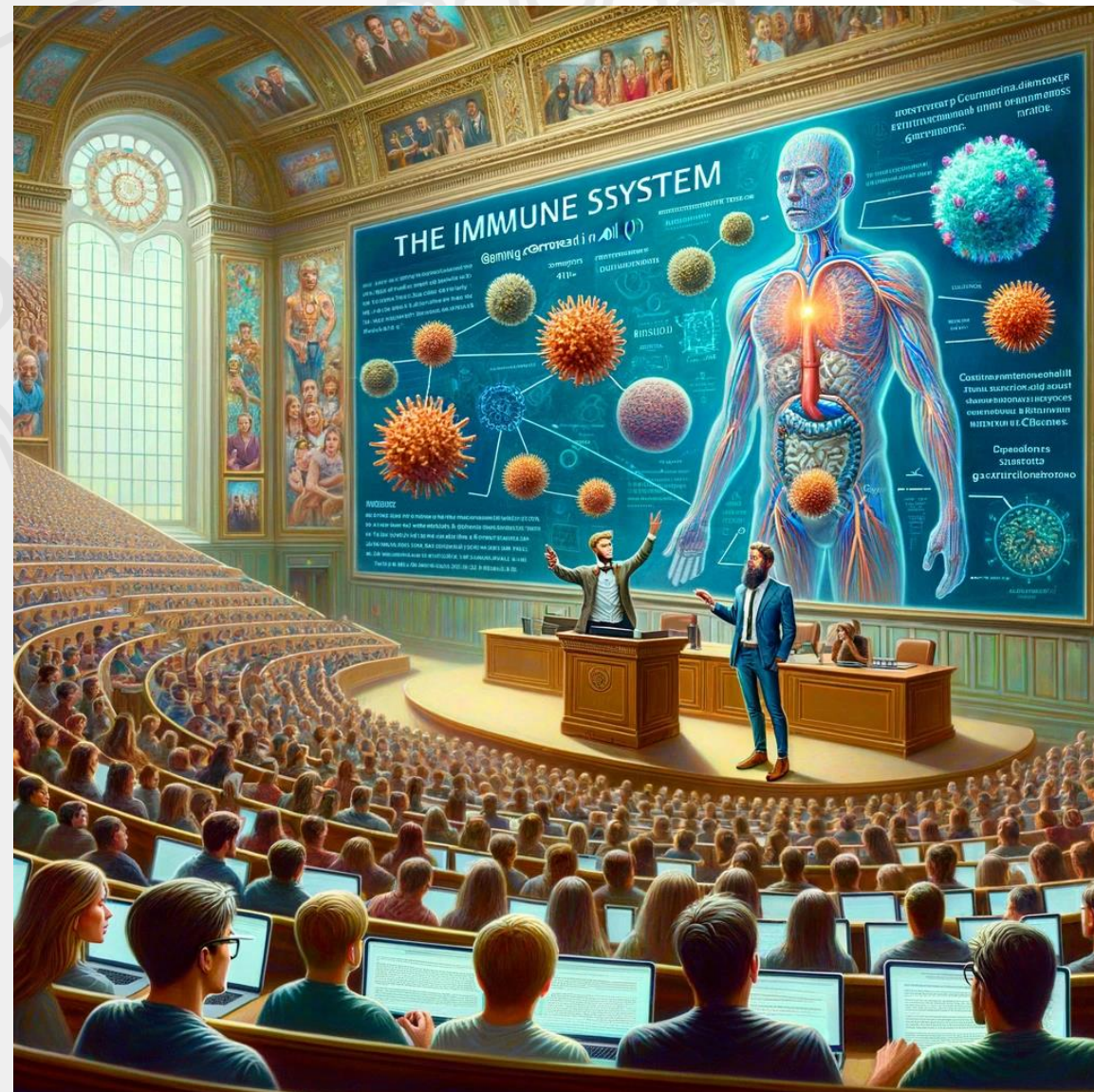
Thank you for your attention

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Back-up to live demo

Instruction: You are an expert in quizzes, and I could use some help creating a good multiple choice quiz questions for students on the **5th semester** of studying **philosophy** at a university.

Central topic: **Socrates**

Instructions: This quiz should contain **1 short question**, based on the “Quiz content” section below.

Question: Create a multiple choice question that is clear and precise.

Quiz Content: **Statements from Socrates**

Answer Options: For question made, provide 5 plausible answer options. Ensure that there is only one correct answer and that false answers are plausible but incorrect.

Feedback: Provide feedback for all the answer options, also the incorrect ones. The feedback should assist the students in understanding why the correct answer is right, but also why the wrong answers are wrong, in order to provide additional information to enhance their learning. Both the feedback to the correct and incorrect answers needs to be elaborate, using 2 sentences.