UCIL

University College for Interdisciplinary Learning

Current Topics in Biology

UCIL20882/92

Unit Coordinator: Dr Ruth Grady

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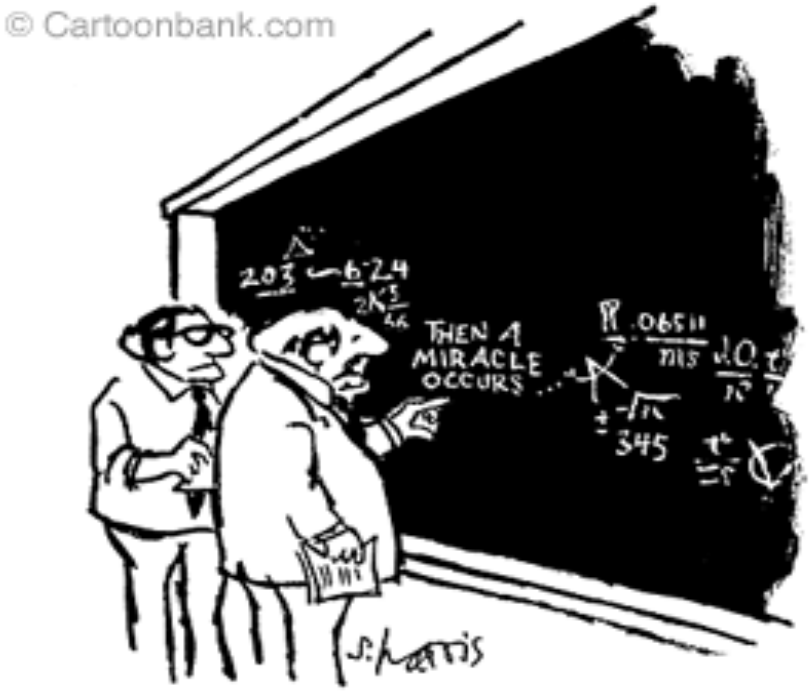
Intended Learning Outcomes:
Students taking this unit will be able to

- Describe and evaluate the basic science underpinning current topical issues in the biological sciences
- Debate and defend informed opinions about current biology issues including their impact on society
- Work collaboratively in an interdisciplinary team to investigate and present an aspect of bioscience research



Content of unit

- 6 Biology Topics to showcase a selection of current & relevant biology

Topics 1 and 2
DNA
Development & Stem Cells

Dr Maggy Fostier
Senior lecturer (Genetics)
Maggy.Fostier@manchester.ac.uk

DNA – some basics

Beyond the Human Genome Project

How the fertilised egg becomes a fully formed adult body

Stem cells and what are their potential therapeutic uses

"What are the differences between embryonic and adult stem cells?"

"What stem cell therapies are showing clinical promise?"

Topic 3

Precision Medicine

Dr Susan Cochran

Susan.cochran@manchester.ac.uk

Senior Lecturer (Pharmacology)

Introduction to the concept and controversies

Tailoring drug treatments for individuals

New technologies and platforms

"Why do some patients respond better than others to the same treatments?"

"What diseases/conditions are best targets for such new approaches?"

Topic 4 Microbes and Infectious Disease

Dr Ruth Grady

Ruth.grady@manchester.ac.uk

Senior Lecturer (Microbiology)

What issues are the most pressing for clinical microbiologists today?

- Superbugs (MRSA), antibiotic resistance and the rise of sexually-transmitted diseases
- Discussion based on a paper: gut bacteria and faecal transplants

"Why are we running out of antibiotics?"

"Are faecal transplants the future?"

Topic 5 The Human Brain

Dr Bipasha Choudhury
Bipasha.Choudhury@manchester.ac.uk
Reader (Anatomical Sciences)

Anatomy of the brain?
Common neurological disorders – Alzheimer's/Parkinson's
Discussion: neurological disorders

"How do nerves work?"
"What happens in brain disorders?"

Topic 6 Conservation Biology

Dr Thomas Nuhse

Thomas.nuhse@manchester.ac.uk

Senior Lecturer (Plant Sciences)

What is biodiversity, can we protect it and why should we care?

“Should we worry about ‘alien’ species?”

“Why is biodiversity important?”

“What damage are non-native species causing?”

How will this course be delivered?

- Each Topic is 3 sessions
  - 2 x Lectures; 1 x discussion format
  - All will be delivered as live on campus
  - Lectures will be podcast
- Coursework component (see later)

- Blackboard presence – please look at it!
  - Lecture slides and videos available from Blackboard (and on video portal suite)
  - Discussion boards on Bb
  - Twitter account @UCIL20882 – will retweet interesting science stories

Timetable of lectures - front page of Bb & Course Information

Current Topics in Biology — **UCIL20882/92**

Unit Coordinator: Dr Ruth Grady
ruth.grady@manchester.ac.uk

Semester 2
Credits 10/20

Monday 5 pm James Chadwick 3.009 ; Thursday 9 am James Chadwick 3.009

Lect.	Date	Staff	Delivery	Content	Coursework Due?
Intro	Week 1 Mon 29th January	RG	Live lecture (podcast available after the event)	Intro to the Course including explanation of assessment	
1	Week 1 Thurs 1st Feb	MF/RG/TN	Live Lab session 2SUGT (teaching labs) Stopford Section 5	Showcasing some of the Topics covered and a quick DNA practical	
2	Week 2 Mon 5th Feb	MF	Live lecture (podcast available after the event)	1) DNA - the basics	
3	Week 2 Thurs 8th Feb	MF	Live Lecture (podcast available after the event)	DNA – and beyond? What we have learnt from the human genome project	
4	Week 3 Mon	MF	Live lecture	2) Development and	

How will this course be assessed?

10 credit UCIL20882

20 %: group video activity

40 %: individual coursework assignment: on 2 x chosen topics

40 %: final online written examination (SAQs)

20 credit UCIL20892

10 %: group video activity

70 %: individual coursework assignment: on 4 x chosen topics

20 %: final online written examination (SAQs)

Coursework

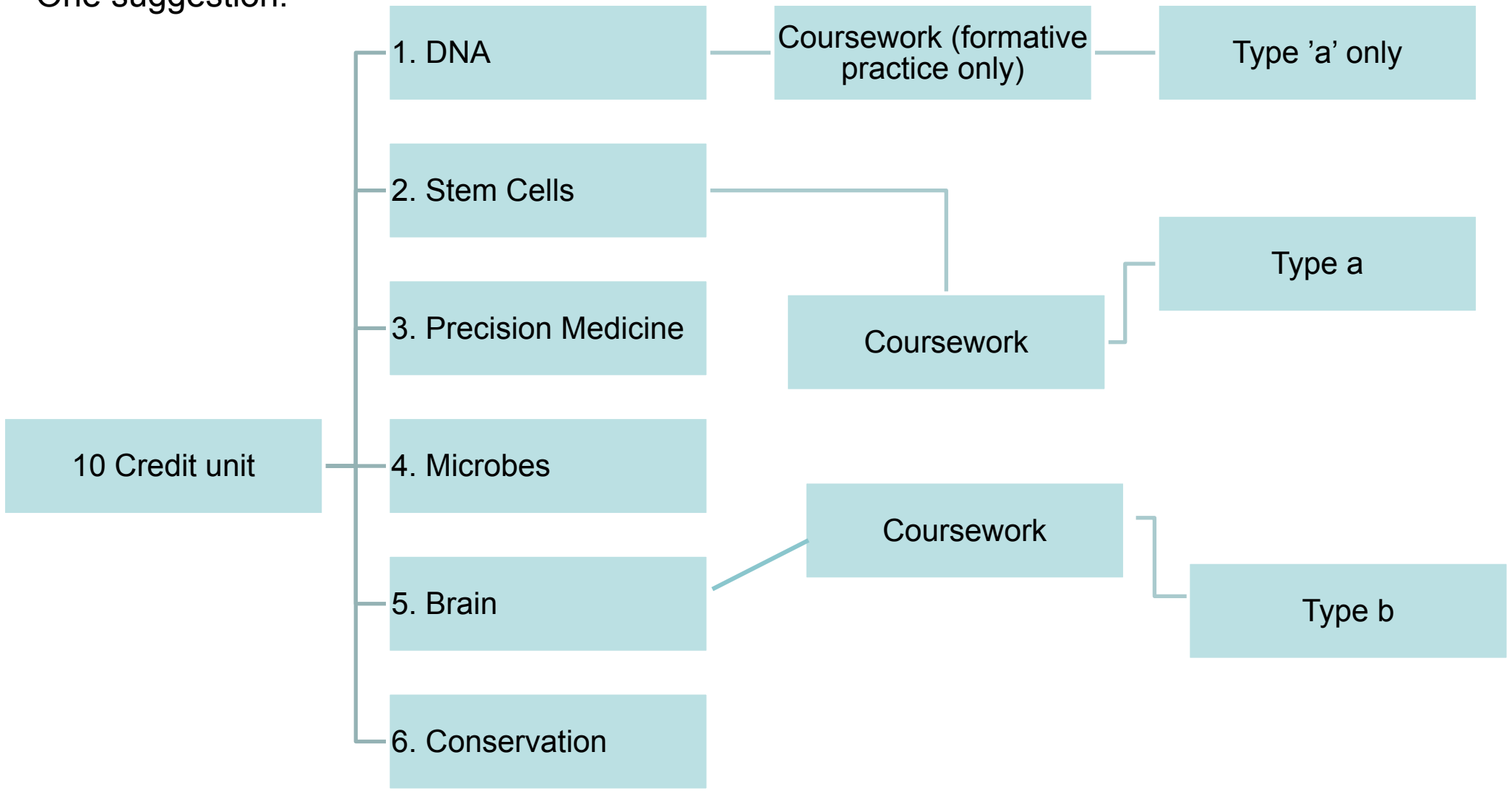
Full details on Blackboard

- 10 C UCIL20882: 2 pieces : choice of 2 *types* of coursework activity (from Topics 2-6)
- 20 C UCIL20892: 4 pieces : choice of 3 *types* of coursework activity (from Topics 2-6)

- Submission deadline Week 11 (after Easter); Thursday May 2nd by 4 pm
  - Submitted & marked via Turnitin on Blackboard
  - Earlier submissions allowed so you can time manage your own workload

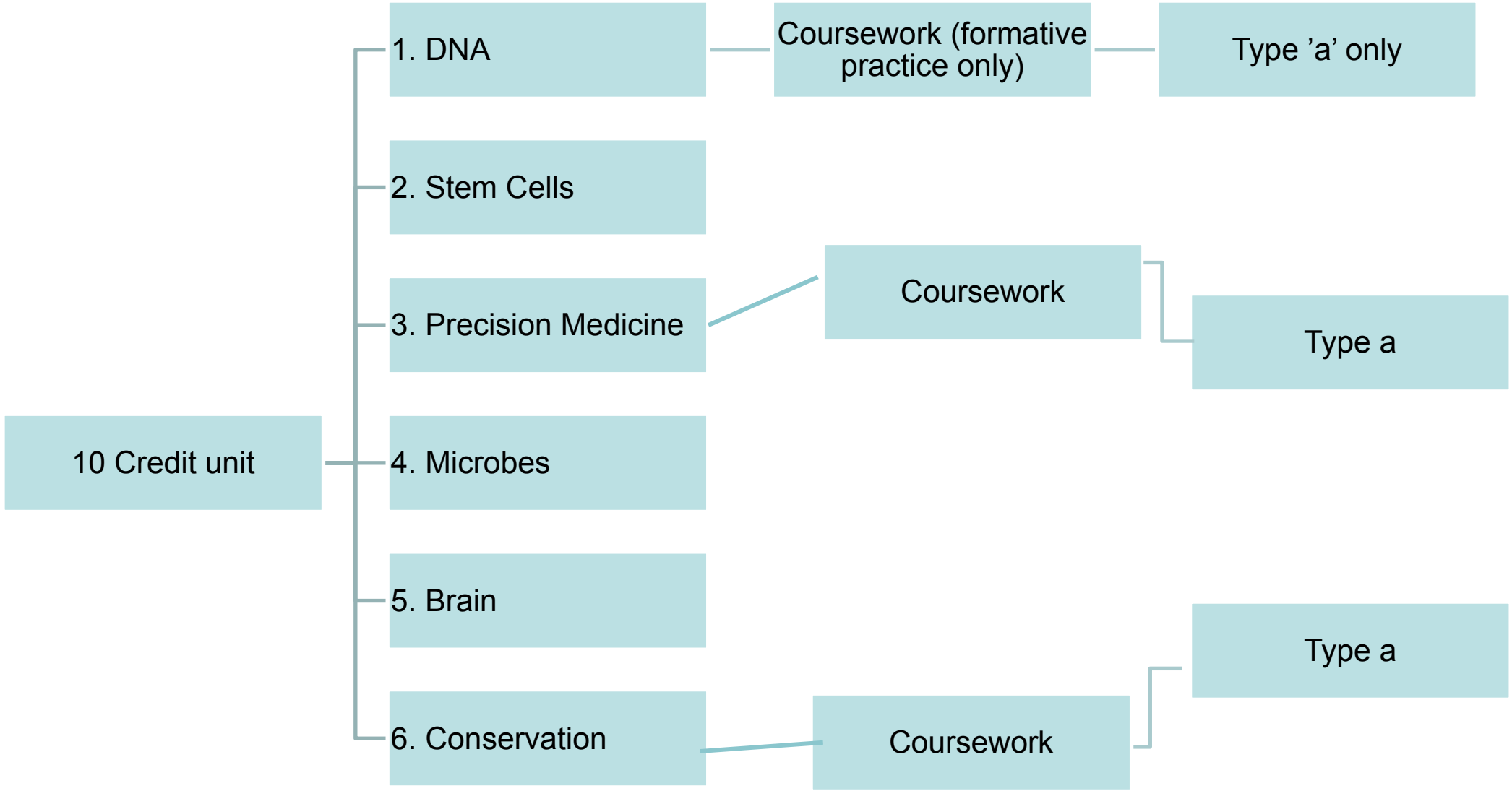
- Formative exercise available
  - Suggested deadline Week 4;
  - Compare your work to work already marked to help with further coursework
  - Can ask for clarification during Dr Fostier's lectures

One suggestion:



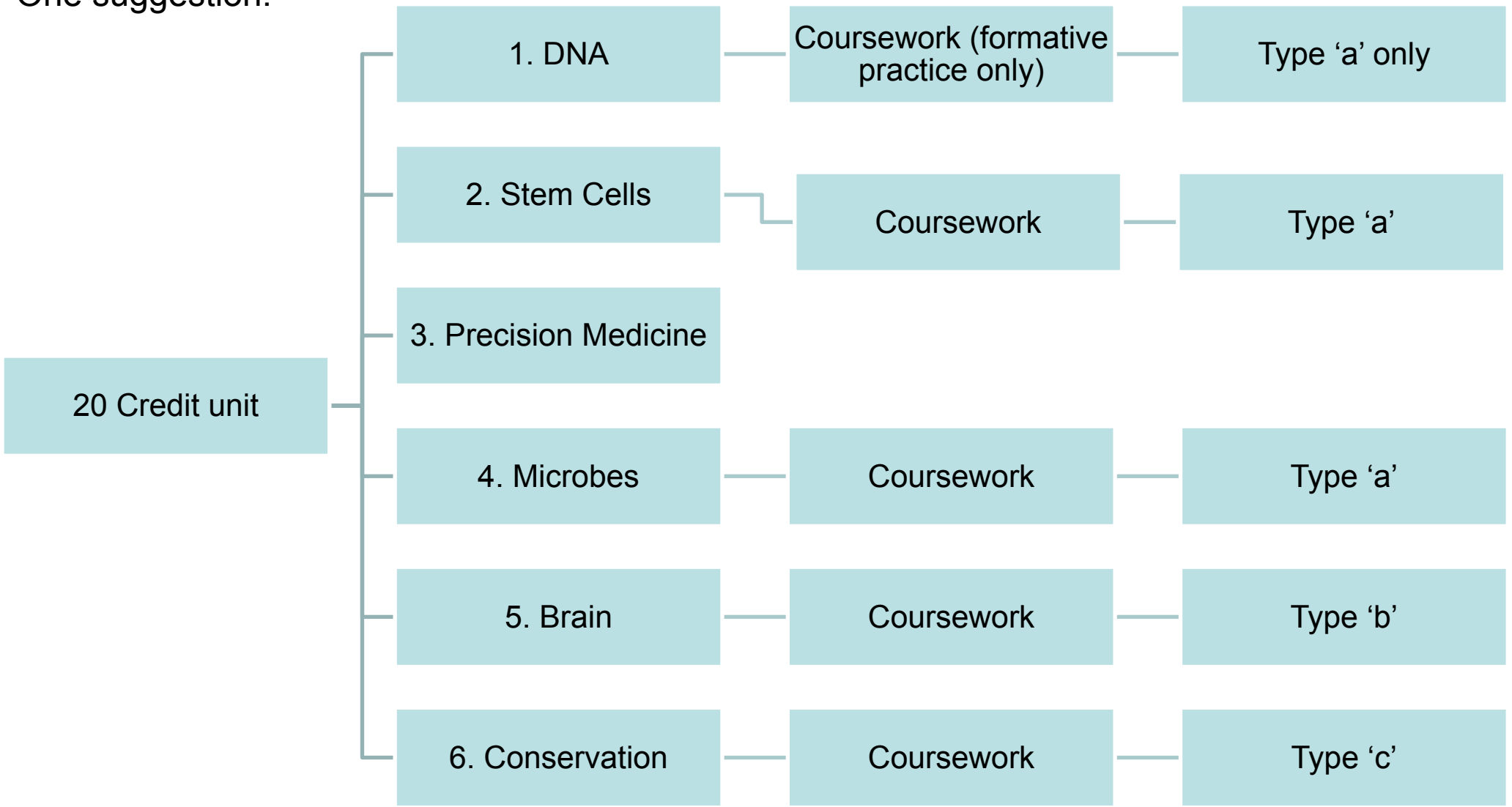
Choose 2 out of 5 topics for the coursework; can only submit either type 2 x 'a' OR 1 x type 'a' and 1 x type 'b'

Another suggestion:



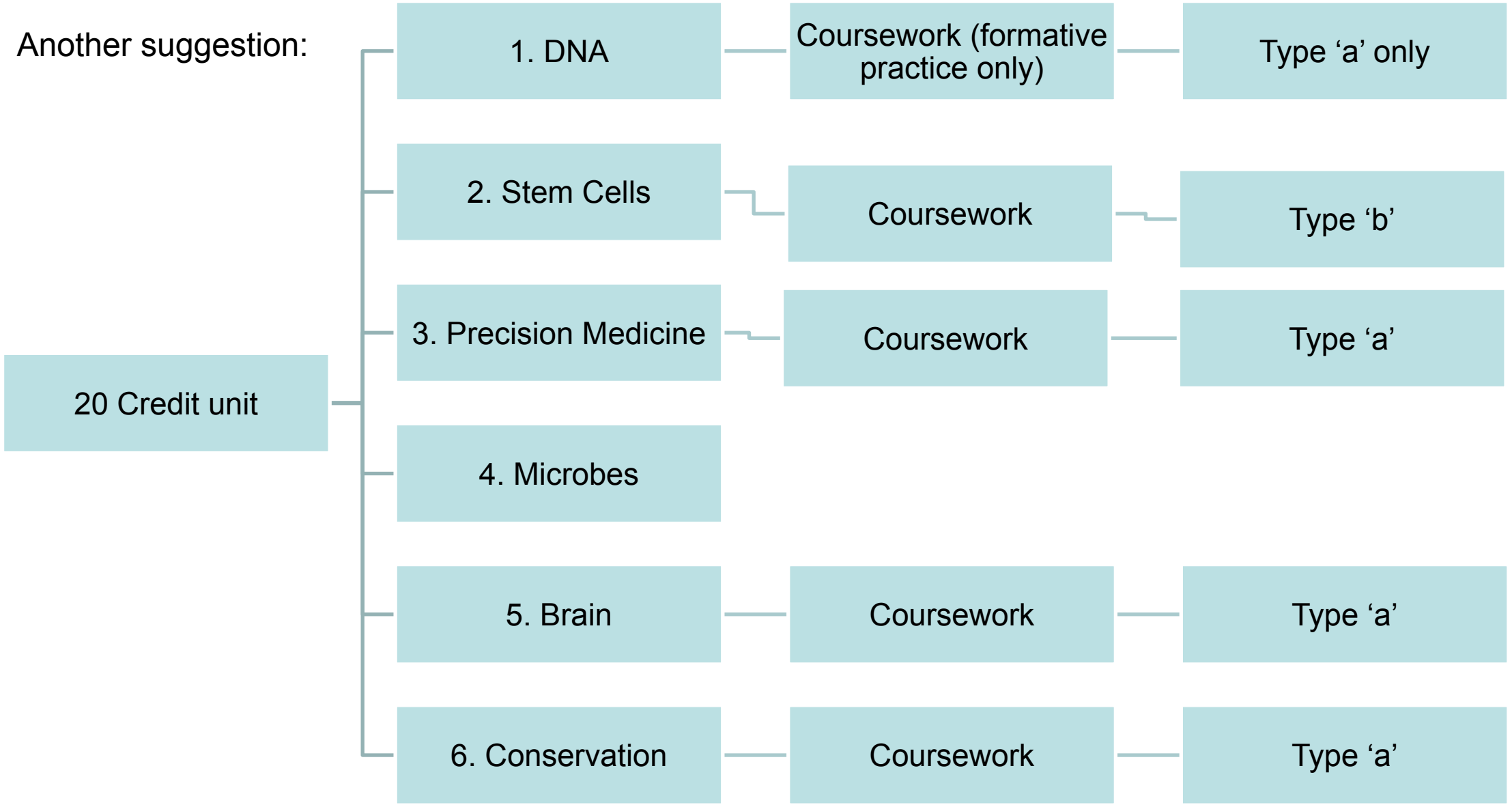
Choose 2 out of 5 topics for the coursework; can only submit either type 2 x 'a' OR 1 x type 'a' and 1 x type 'b'

One suggestion:



Choose 4 out of 5 topics to complete the coursework; can only submit 1 of type ‘b’ and 1 of type ‘c’; can all be type ‘a’ if you prefer

Another suggestion:



Choose 4 out of 5 topics to complete the coursework; can only submit 1 of type ‘b’ and 1 of type ‘c’; can all be type ‘a’ if you prefer

Coursework (a)

- Chose a newspaper /media headline/story from Social Media that is part of Topics 2-6
- Write a lay summary (0.5 A4 page) and a technical summary (0.5 A4 page) explaining the story
  - Should be a clear difference in ***language*** (and tone) but content the same
  - No citations necessary
- Using Google Scholar or PubMed, showcase 5 research papers linked to the bioscience Topic
  - Harvard citations and a brief summary (1/3 page) of the papers required
- Can select the topic even if the lectures have not taken place yet!

Sample Coursework… (on Bb)

- **Summary statement** explaining the link to Topic 4 ‘Microbes and infectious disease’. In this topic we covered the gut microbiota and its relationship with systemic health, and how diarrhoeal disease can be overcome using faecal transplants. The story presented below is about faecal transplants in Koala bears. The accompanying 5 references relate gut microbiota with different diseases or conditions.
- **Headline**: Faecal transplants ‘could save endangered koala’ The Guardian, June 2023
- **Lay summary**: The koala population has been drastically reduced in the last century through human urbanisation and destruction of the koalas’ natural habitat. Koalas survive by eating the leaves of the eucalyptus; there are two type of eucalyptus (messmate and manna-gum) and most koalas only eat one variety ……
- **Science summary**: The koala (*Phascolarctos cinereus*) is an arboreal herbivorous marsupial native to Australia and is found in coastal areas of the mainland's eastern and southern regions. The koala population has been drastically reduced in the last century due to the habitat destruction caused by agriculture and urbanisation. Most of koalas’ diet consists of several *Eucalyptus* genera (*Eucalyptus microcorys, E. tereticornis*, and *E. camaldulensi; …..*

[May need to do some extra reading to fill in the science detail]

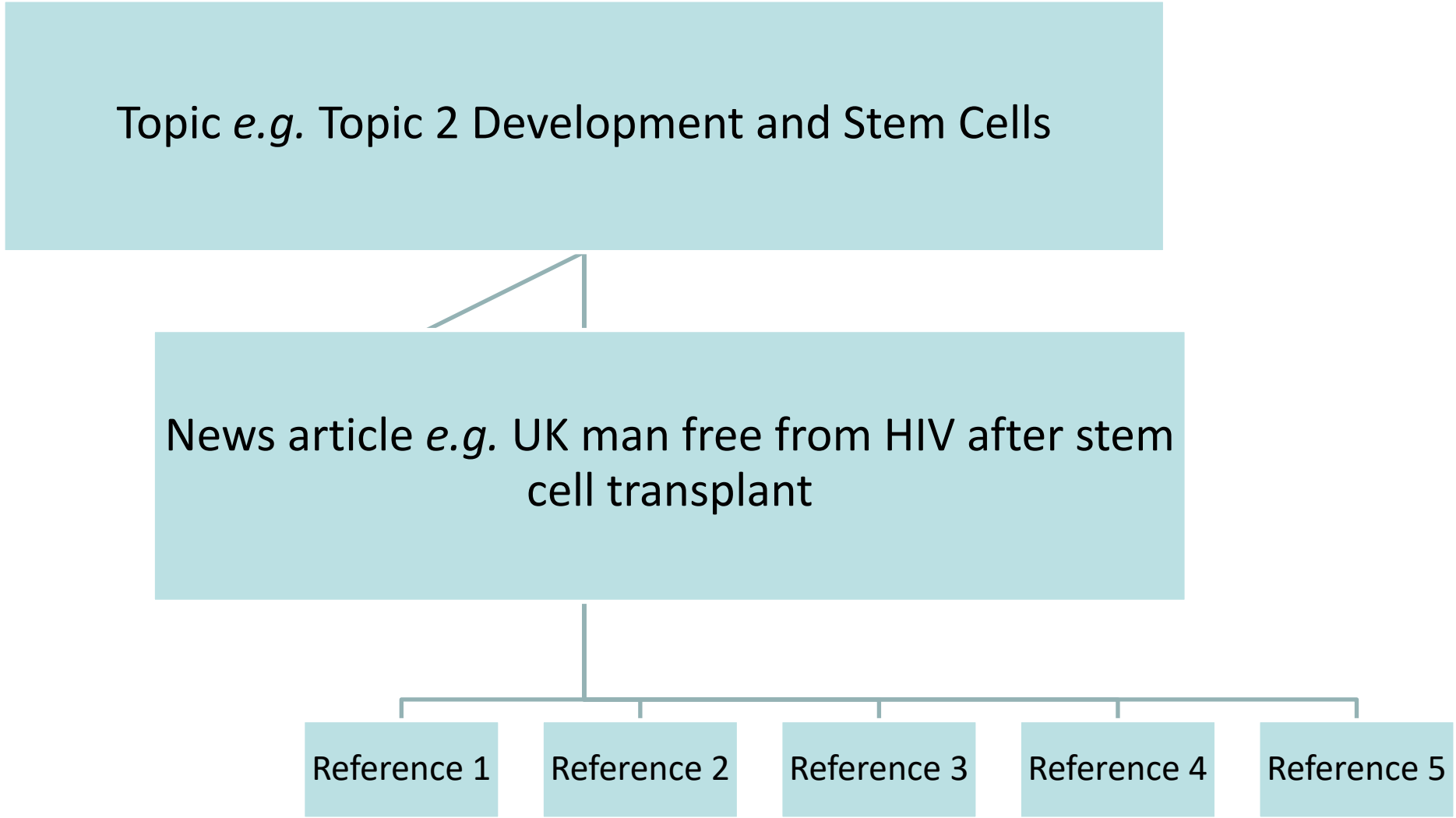
5 current references required

- Paramsothy, S., Kamm, M.A., Kaakoush, N.O., Walsh, A.J., van den Bogaerde, J., Samuel, D., Leong, R.W., Connor, S., Ng, W., Paramsothy, R. and Xuan, W., 2020. **Multi-donor intensive faecal microbiota transplantation for active ulcerative colitis: a randomised placebo-controlled trial**. The Lancet, 389 (10075), pp.1218-1228.

- **Summary**: The utility of faecal transplants for patients with *C. difficile* infections has previously been shown. This study now shows that using several faecal transplants from multi-donors is a promising treatment for patients with ulcerative colitis. It is not yet known which specific bacteria are associated with negative and positive outcomes, or what the molecular mechanisms are for the bacteria to be protective. In the future, being able to match donors and recipients could lead to a more personalised treatment for this inflammatory bowel condition

Notes about CW (a)

- **Use your own words (do not cut and paste the abstract)**
- **These references need to be related to the Topic from the course,** even if the article is on a different aspect. For instance I would not expect to see any cited references about koalas here!
- Approx.1/3 page of A4 (200 words)
- The references need to be up-to-date (non pre-2020)
- Before submitting, check this assignment has the following headings:
  - Statement of where the references link to the chosen Topic
  - Headline from newspaper/ social media story; date
  - Lay abstract
  - Science abstract
  - 5 current scientific references from different areas but related to the overall Topic with summaries (200 words/no more than 1/3 page each)



- Would expect all 5 references to be about stem cells used therapeutically or if they are a particular type of stem cell, 5 articles about different aspects of these particular cells; NOT about HIV or transplants in general or other developmental aspects from Topic 2
- References need to cover different content (so not three papers from the same lab)
- References need to be research NOT a general commentary or a review or lecture material

Marking Scheme (/30)

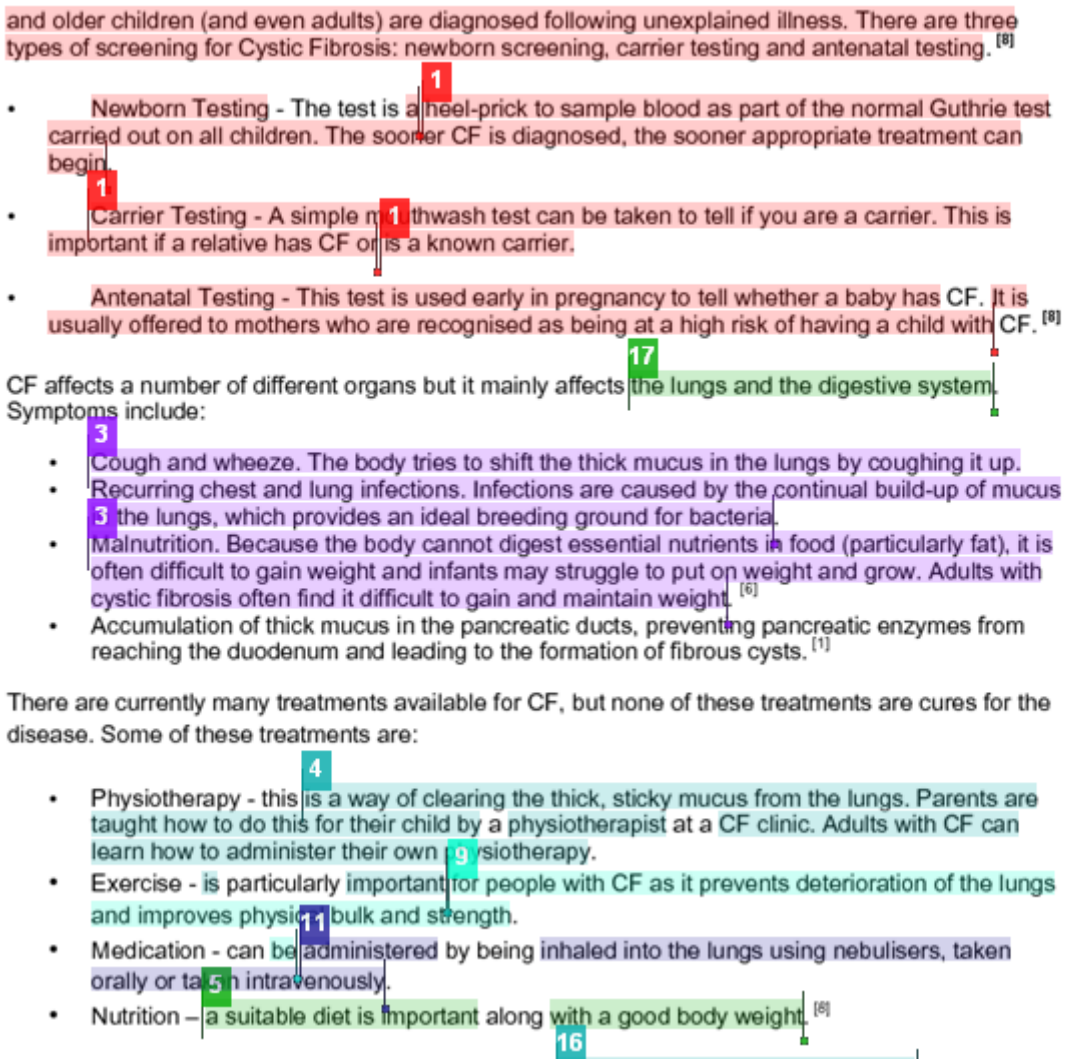
Criteria: Lay/Science summaries (/10):

- Communication of science
- Use of language
- Length

Criteria: Accompanying references (/20):

- Quality of chosen references (from last 5 years)
  - Research papers
- Applicability to topic
- Correct citation
- Summary of research papers (in your own words)
- Use of English

‘Turnitin’- Plagiarism detection



and older children (and even adults) are diagnosed following unexplained illness. There are three types of screening for Cystic Fibrosis: newborn screening, carrier testing and antenatal testing. [8]

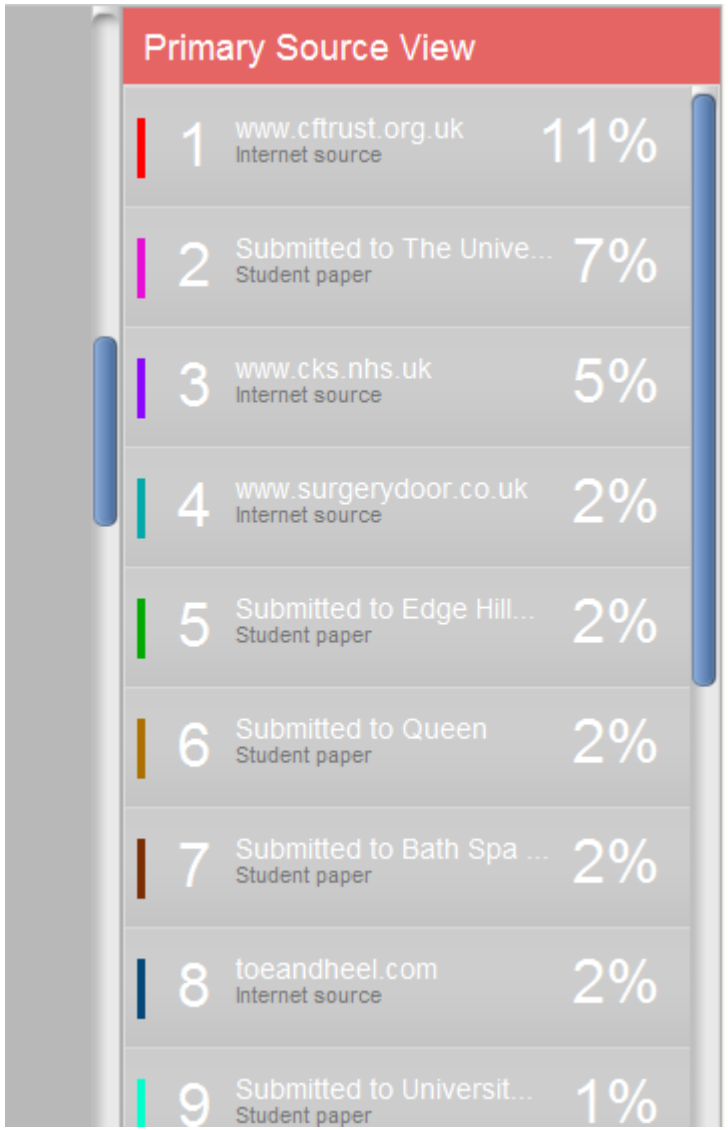
- Newborn Testing - The test is a heel-prick to sample blood as part of the normal Guthrie test carried out on all children. The sooner CF is diagnosed, the sooner appropriate treatment can begin.
- Carrier Testing - A simple mouthwash test can be taken to tell if you are a carrier. This is important if a relative has CF or is a known carrier.
- Antenatal Testing - This test is used early in pregnancy to tell whether a baby has CF. It is usually offered to mothers who are recognised as being at a high risk of having a child with CF. [8]

CF affects a number of different organs but it mainly affects the lungs and the digestive system. Symptoms include:

- Cough and wheeze. The body tries to shift the thick mucus in the lungs by coughing it up.
- Recurring chest and lung infections. Infections are caused by the continual build-up of mucus in the lungs, which provides an ideal breeding ground for bacteria.
- Malnutrition. Because the body cannot digest essential nutrients in food (particularly fat), it is often difficult to gain weight and infants may struggle to put on weight and grow. Adults with cystic fibrosis often find it difficult to gain and maintain weight. [6]
- Accumulation of thick mucus in the pancreatic ducts, preventing pancreatic enzymes from reaching the duodenum and leading to the formation of fibrous cysts. [1]

There are currently many treatments available for CF, but none of these treatments are cures for the disease. Some of these treatments are:

- Physiotherapy - this is a way of clearing the thick, sticky mucus from the lungs. Parents are taught how to do this for their child by a physiotherapist at a CF clinic. Adults with CF can learn how to administer their own physiotherapy.
- Exercise - is particularly important for people with CF as it prevents deterioration of the lungs and improves physical bulk and strength.
- Medication - can be administered by being inhaled into the lungs using nebulisers, taken orally or taken intravenously.
- Nutrition – a suitable diet is important along with a good body weight. [6]



Citing science references

Refer to: My Learning Essentials guide to referencing

Journal articles

Snowden, D.J. and Boone, M.E. (2007) 'A leader's framework for decision making', *Harvard Business Review*, 85(11), pp. 68-76.

Author
This is normally listed as the first element of a reference.

Date
The year that the article was published.

Article title
The full title of the article, including any subtitles.

Journal title
In the Harvard style, the journal title is italiced. An e-journal would have [Online] after the journal title.

Volume and issue number
Academic journals are published frequently, and they are organised by volumes and issues. The first number is the volume number; the issue number appears in brackets after the volume.

Page numbers
These are the page numbers of the article within the particular volume and issue of the journal. For a single page, this would read p. 68 rather than pp. 68 - 76.

Coursework (b)

Write a 3-page essay highlighting the influence your degree programme/discipline has on, or is influenced by, or intersects with one of the biology Topics 2-6 offered in this course.

Chance to be inspired!

Mock example: Microbiology intersecting with BA (Hons) Basket-weaving with French

Notes about CW (b)

- **Before submitting: check this assignment (b) has the following:**
  - Which Topic (2-6) is being linked to your degree programme
  - Describe your degree programme including references
  - Describe how the Topic intersects with your degree programme
  - Concluding paragraph
  - References

Marking scheme (b)

All criteria marked equally /30

- Description of degree undertaken
- Description of intersection with bioscience topic
- Strength of argument
- Range of chosen references
- Correct citation of references
- Overall length
- Use of English

20C only: coursework (c)

- Describe a concept or problem from one of the Topics that you found hard to understand

- Write a short summary of the concept in lay terminology and what or why you found this difficult to understand

- Create a learning resource/figure/analogy that helped you to get over this ‘bottleneck’ in your understanding that could be used to help other students. This could be in the form of a cartoon, mnemonic, diagram, poster etc. Describe the concept in technical language

- Example: on Blackboard

Notes about CW (c)
NB only for UCIL20892 students

Before submitting check this assignment (c) has the following:

- Lay summary of the concept
- Description of the problems you had to start with
- Technical summary to show you now understand the concept
- Show your learning resource/ tool for overcoming the concept barrier

Marking scheme (c)

All criteria marked equally /30

- Lay description of concept
- Description of difficulty
- Description of learning tool: analogy/presentation/ mnemonic
- Usefulness of output
- Technical description of concept
- Use of English

Combination of CW choices allowed

10C unit: chose either piece 2 x (a) OR 1 x (a) and 1 x (b)

20C unit: you can offer the following combinations of CW:

- 2 x (a); 1 x (b) and 1 x (c)
- 3 x (a); 1 x (b) *or* 1 x (c)
- 4 x (a)

- Each piece from a different Topic (2-6)

Video Coursework

- Work collaboratively in an interdisciplinary team to investigate and present an aspect of bioscience research
  - As a team produce a single 3 min video that presents a current biological research paper
  - Could use one of your papers you have found by completing the coursework
  - Can be in the same topic area as your individual coursework
  - Use a current Twitter story etc.
- Will be put in groups by Week 7 (before Easter)
- Will match Year Group (where possible)
  - *ie* all year 1 or final year etc
- Communicate with each other via Blackboard or via email
- After submitting you can peer review each other's videos

Examination in May

- 90 min; in-person (online - PC Cluster)
- Closed book
- 6 SAQS (short-answer questions) submitted on Blackboard
- 1 from each topic
- Example questions (and answers) will be available on Blackboard during the semester
- No past paper as content changes & reformatted course
- Preparation for assessment session after Easter

Comment from previous students

- *This course was very interesting and gave a good introduction to biology. It was accessible for people like myself who don't have a background in biology and was very relevant to current topics in the news.*

- *I found that content unbelievably interesting and even though each topic (out of 6) had only 2/3 lectures, each of the lectures were so interesting and I feel like they covered the perfect amount of detail.*

- *I valued the diversity of this unit, I feel like I have learnt loads & all of it is topical & interesting. I would definitely recommend this unit.*

- *I liked the fact that we had to do a group video, something I've never done before, that enabled the group to be more creative than just setting us an essay*

- *I enjoyed the individual coursework assignment too as I had to approach it differently, it made a refreshing change from the standard essay assignments we normally get.*

Feedback

- Ask questions in the lectures & discussion sessions
  - Check your understanding
- Use Bb to post questions on the Discussion Board
- We encourage you to practice the coursework type (a)
  - By Week 4;
  - Based on Topic 1 (DNA and the Human Genome Project)
  - Will release feedback comments from sample answers to help with further CW
- Have a go at the practice assessment questions to check your understanding

Spread the word: we can accept transfers to the unit up to the end of week 2