

Online Resource 1 – Description of the lectures

Each meeting started with a lecture of about 45 minutes, guided by a PowerPoint presentation. As the teacher group consisted of well-educated biology teachers, all with long experience, it was possible to carry out the lectures on a rather high level concerning the teachers' understanding of biology in general and genetics in particular. However, epigenetics was new to them, just as research about genetics education and theories of transformation of knowledge from the academy to school. As the authors of this study master different contents in the themes, the lectures were distributed among the authors to optimize their expertise. To encourage an engaged participation during the lectures, the teachers were asked to put questions whenever they wanted.

Lecture one

Theme: Scientific content about epigenetics and its implications for society, focusing life style issues of importance for students.

As the whole project dealt with epigenetics, a new research field in biology, it was important to present basic epigenetics knowledge for the teachers. This was done by describing core features of epigenetics, showing epigenetics' role for linking genes and the environment, giving examples of this connection (life style issues) and, at last, by discussing if epigenetics patterns could be inherited.

The PowerPoint presentation included the following parts:

1. What is epigenetics? (Description of core features of epigenetics)
2. When during life take epigenetics processes place? (Cell differentiation and continuously during the rest of the life)
3. Different epigenetics processes. (DNA methylation, histone modifications, regulatory RNAs)
4. Epigenetics – the link between genes and the environment. (Molecular processes explaining this connection)
5. Health issues – epigenetics and food. (Examples of molecular processes explaining the connection)
6. Health issues – epigenetics and physical activity. (Examples of molecular processes explaining the connection)
7. Do epigenetics changes pass on to next generations? (Indicated in model organisms but not proved for humans)

Lecture two

Theme: Curriculum and didactical theories of transformation of scholarly knowledge into taught and learnt knowledge in school.

Epigenetics was discussed in relation to existing genetic education models, students' understanding of the concept of genes, the didactical triangle, and which genetic models are used in Swedish textbooks. Further, common misconceptions among the students were discussed.

The PowerPoint presentation included the following parts:

1. The central dogma. (Information direction from DNA to RNA to protein)
2. Genetics versus epigenetics. (Comparison of information directions)
3. The didactical triangle. (Student, teacher, knowledge)
4. Genetics models. (Deterministic, additive, interactive)
5. Models of genes and how students discern the gene concept. (Gene-P, Gene-D, historical models)
6. Didactic transposition. (Scholarly scientific knowledge, scientific knowledge to be taught, scientific knowledge actually taught, learnt scientific knowledge)
7. Swedish text books. (Description of which models are prevailing)
8. Common misconceptions. (Examples from genetics education research)

Lecture three

Theme: Introducing epigenetics to genetics education through the lens of genetics education research.

The lecture presented up-to-date research about genetics education. It dealt with some of the big questions in genetics education, e.g. genetic determinism, the relation between genes and the environment/characteristics, models in genetics education and the concept of Big ideas. To clarify the content, several citations from research studies were included and discussed during the lecture.

The PowerPoint presentation included the following parts:

1. Genetic determinism. ('Our DNA is our destiny', too much focus on genes, genetic determinism could lead to social-cultural aspects being neglected)
2. Genes and the environment. (Discussions out of examples from citations in research studies)
3. Genes and characteristics. (Discussions out of examples from citations in research studies)
4. Models in genetics education. (Learning progression, Big ideas, etc.)
5. Two questions discussed in relation to Big ideas completed the lecture (What are the influences of genes on organisms' appearances and functions? Why are we different from other human beings?)

Lecture four

Theme: Aspects of epigenetics which ought to be included in genetics education according to experts in a Delphi-study.

What did epigenetics experts regard as important to include in the biology curriculum? The question was asked in the Delphi study, one of the subprojects of the 'Epigenetic literacy and the implementation of epigenetics in school biology' project. The design of the Delphi study and results from it was presented to the teachers.

The PowerPoint presentation included the following parts:

1. Aim of the Delphi study. (What does a citizen need to know about epigenetics? What ought to be included in the biology curriculum?)
2. What is a Delphi study? (Description of how a Delphi study is designed)

3. Description of how the Delphi study about epigenetics was designed. (Participating experts, subject areas of interest, number of rounds etc.)
4. Presentation of the result. (Three groups fell out: epigenetics from a science perspective, epigenetics from a social science perspective, epigenetics from an educational perspective)