Abstract

Molecular biology and genetics represent some of the most challenging biological topics for students, a correct understanding is also essential for the other chapters of biology and chemistry. The learning progression test is a tool that allows to determine the level of understanding of the given fields, which can serve as feedback that can be followed up in a targeted manner in further teaching. The aim of this work was to translate and subsequently validate the test of learning progression in molecular biology and genetics from the English original "Learning Progression-Based Assessment of Modern Genetics". Another goal of the thesis was to explain the possible influence of variables (e.g. participation in a biology seminar, science competitions or future study focus) on the overall score. Validation took place in several phases (checking the translation by experts and didactics, testing at schools and subsequent evaluation and analysis). Grammar school students completed the test online during biology class. They achieved a low level of understanding of heredity at the molecular level, further in the area of the influence of the environment on genetic information, the transfer of genetic information to offspring, and in general it is difficult for them to apply theoretical knowledge to specific examples. Students make mistakes in basic genetic concepts and the relationships between them, which is also described by other authors. Those who attended a biology seminar or plan to study biology at university achieved a significantly higher total score than the others. Furthermore, those students who participated in science competitions or considered genetics to be important also achieved significantly higher scores. The results of this thesis can be used for the creation of teaching materials that target precisely the problematic area or misconceptions, as well as for feedback of the students' current understanding of genetic concepts.

Key words: molecular biology, genetics, molecular genetics, teaching, grammar school, upper secondary school, high school, learning progression test