

## Vanilla flavoured synthetic biology workshop for general public visiting the museum

**Keywords:** synthetic biology, participatory activity, workshop, research funding

MUSE (Trento, Italy) has developed a workshop activity to demonstrate how the vanillin flavour is produced using innovative synthetic biology techniques. This activity includes all the “ingredients” needed to engage lay citizens in the responsible research and innovation (RRI) process in the field of synthetic biology, through a participatory approach. In the beginning, a facilitator gives an introductory explanation on the use of vanilla and an overview of the methods for the extraction/production of vanillin. Moreover, according to the RRI approach, the introduction shows the views of three main actors involved in the matter, i.e.: (i) the synbio industry producing the vanillin flavour (through a video clip produced by the industry and available on its web site, which supports its production method), (ii) the environmentalist position (through a video clip available on the web site of a selected ONG, which analyses the bio-economic impact of synbio vanillin production, in particular on local farmers); (iii) the scientific community (through an *ad hoc* video we realized, which presents an interview to a synbio scientists focussed on scientific informations, opportunities and risks). This propaedeutic section is followed by a practical demo that simulates the genetic manipulation to produce the vanillin molecule responsible of the vanilla aroma. Such as hands-on part of the activity is based on puzzles made up of pieces designed to represent the genomes of the four organisms (yeast, human, fungi and bacteria) and the respective genes and genomes involved in the production of vanillin molecule. This graphic simplification aims to clarify the genetic engineering procedure for producing vanillin. In this puzzle-game, participants are requested to identify in each of that 4 genomes the right pieces representing the “genes of interest” and to transfer them into the puzzle representing the yeast genome. A crucial phase is participants’ evaluation of the activity for checking their understanding of the key messages emphasized during the workshop



and for assessing the activity. Therefore, participants are requested to complete an *ad hoc* questionnaire. Finally, by filling in a cheque facsimile, participants are invited to express their wiliness/unwillingness to invest public money in research on synthetic biology, and eventually in which field among health, ago-food and environment. This activity was developed as a part of the SYNENERGENE project that has received funding from the European Union's 7<sup>th</sup> Framework programme under grant agreement No. 321488, for more information visit [www.synenergene.eu](http://www.synenergene.eu)

MUSE - Museum of Science, Trento (Italy)

[www.muse.it](http://www.muse.it)

Patrizia Famà and Lucia Martinelli

[patrizia.fama@muse.it](mailto:patrizia.fama@muse.it)

[lucia.martinelli@muse.it](mailto:lucia.martinelli@muse.it)

### What makes this practice RRI-oriented?

Diversity &Inclusion	The activity offers the visitors to consider views of different stakeholders involved in the field of synthetic biology. The activity also aims to include citizens in the decision-making process on the funding of the fields in synthetic biology.
Openness &Transparency	The aim of the activity is to openly communicate about the field of synthetic biology.
Anticipation &Reflection	The workshop invites visitors of the museum to reflect on the implications of the new technology. They could then themselves decide which research in which field they want to fund.
Responsiveness &Adaptive Change	The practice allows citizens to voice their opinions on the future of the research in the field of synthetic biology.