STRAIN-RELEASE FUNCTIONALIZATION OF DONOR-ACCEPTOR CYCLOPROPANES ENABLED BY VITAMIN B_{12}

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„Nature is the source of all true knowledge. She has her own logic, her own laws, she has no effect without cause nor invention without necessity."

Leonardo da Vinci

As early as in the Renaissance Leonardo da Vinci reached the conclusions the evidence for which we, as the scientists, discover every day. Nature is an endless source of inspiration for all areas of science which constantly benefit from its simple and smooth methods of solving the most complicated problems. This imitating was named 'biomimicry' and is expressed in da Vinci's visionary Ornihopter designed to enable human flight as well as in the Velcro – the sticky material present in the clothing for all of us, inspired by the sticky plant burrs.

Nature has been the engine of progress also in chemistry. Fermentation performed by millions of microorganisms is one of the fundamental pillars of food industry, whilst photosynthesis become a cornerstone of the whole new field named photochemistry which strives to solve current energy problems and is one of the strategies for making the chemical industry environmentally-friendly.

Once we get deep into synthetic chemistry we will discover, that most of the groundbreaking reactions have their roots in the transformations occurring in the living organisms. And even though this area is already explored for hundreds of years, on the map of Nature-inspired reactions there are still the blank edges that need to be filled. The necessity of exploring those processes comes not only from the scientific curiosity, but also from the constant demand for creating new, more ecological, more efficient, more economical methods which will give us an access to unknown or currently inaccessible chemical molecules. Those organic compounds may cause a breakthrough in the medicine, material or food industry or they can just demonstrate the properties which we don't even suspect at the moment.

I have also t**aken an inspiration from the natural enzymes' cofactor – vitamin B_{12}** – a compound widespread in most of the living organisms, necessary for our health. **I will use it to reverse the polarity of donor-acceptor cyclopropanes** - the molecules which draw their tremendous potential from unusual strain. Strain expresses an excess of energy – just like in the case of tight rope – it facilitates the disruption of the bond (or the rope's fibers). **The combination of the vitamin B_{12} catalysis and such unique substrates as the donor-acceptor cyclopropanes will allow for developing unprecedented functionalizations and will give an access to unknown molecular scaffolds which may prove to have exceptional properties**. In the era of intensive search for innovative, environmentally-friendly reactions to create modern synthetic toolbox, the envisaged methodology should be quickly implemented and exploited for the industrial, especially medicinal, purposes.