

CERTIFICATE OF ATTENDANCE

This is to certify that Ms.

Anna Fülöp

Has attended the XVth edition of International Conference
'Students for Students'
with the paper

**Synthesis and development of red fluorescent calcium sensors
for two photon imaging**

Cluj-Napoca, Romania, 18th-22nd of April

Organisers

Andrei-Ionuț Vierașcu Dumitrița Aura Crișan

Vierașcu



Synthesis and development of red fluorescent calcium sensors for two photon imaging

Anna Fülöp^{1,2}, Márton Bojtár¹, Zoltán Mucsi², Ervin Kovács[§]

¹*Department of Organic Chemistry and Technology, Budapest University of Technology and Economics, Budafoki út 8., 1111 Budapest, Hungary*

²*Femtonics Kft., Tűzoltó u. 59., 1094 Budapest, Hungary*

[§]*Research Centre for Natural Sciences, Hungarian Academy of Sciences, Magyar tudósok körútja 2., 1117 Budapest, Hungary*
fulopanna196@gmail.com

The calcium ion has an essential role in numerous processes in the living organism. The well known fluorescent calcium sensors are able to sense the free calcium ion in the intracellular space, following-up the time and space dependent changing of cellular Ca²⁺ ion concentration. The optical observation in a neuron shows direct information about the neuronal activities. The two-photon microscope technology is suitable for imaging of three dimensional tissue so these experiments have also become applicable *in vivo*.

Many fluorescent calcium indicator is known, but there is not a good sensor with right properties for two-photon *in vivo* imaging. The most frequently used ion chelating molecule is the 1,2-bis(o-aminophenoxy)ethane-*N,N,N',N'*-tetraacetic acid (BAPTA). Combining this receptor with a fluorescent dye results a calcium sensor. Our goal is to find a new fluorophore with right fluorescent properties: intensive red emission, good two-photon absorption, and good water solubility. In the literature the ATTO 590 fluorophore has one of the best two-photon properties, so we aimed to repair it's other properties. Because of the positive charge of this dye, it can accumulate in the mitochondria. We introduced carboxyl groups into the molecule to remove its positive charge and avoid accumulation. With this fluorophore we can get a new, red calcium sensor for two photon imaging.

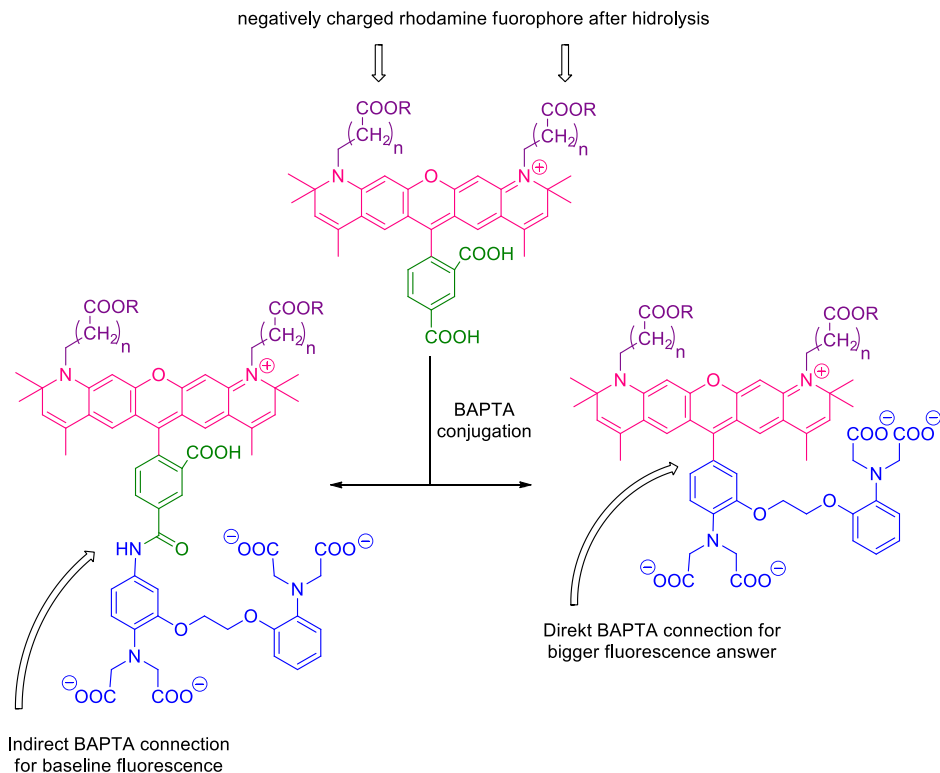


Fig. 1: The synthetic purpose of the preparative work.

- [1] Göppert-Mayer, M., Annals of Physics, **1931**, 401, 273–294.
- [2] Oheima, M.; Hoff, M.; Feltz, A.; Zamaleeva, A.; Biochimica et Biophysica Acta, **2014**, 1482, 2284–2306.
- [3] Belov, V. N.; Bossi, M. L.; Fölling, J.; Boyarskiy, V. P.; Hell, S. W.; Chemistry - A European Journal, **2009**, 15, (41), 10762–10776.