

Location: Gdańsk, Poland – International Centre for Cancer Vaccine Science.
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PROJECT DESCRIPTION

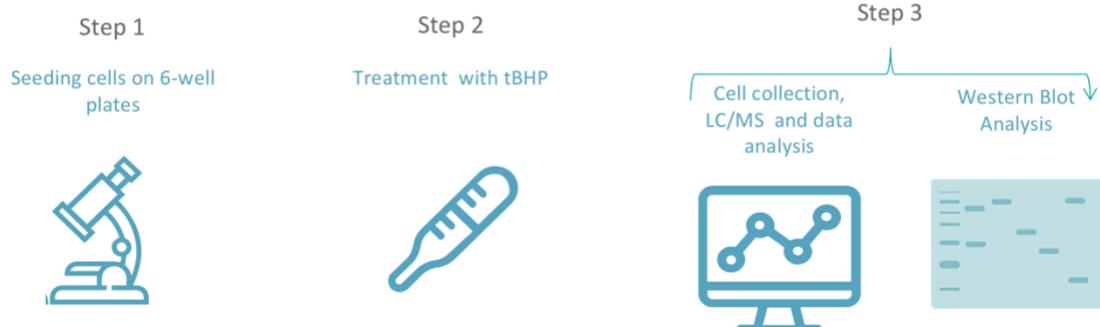
Investigation of the role of CHIP in the development of neurodegenerative diseases such as Alzheimer's Disease, Parkinson's Disease and Huntington's disease.

World Health Organisation describes **dementia** as a syndrome occurring as a result of impairment memory, thinking, comprehension, calculation, learning, language and judgement. **Alzheimer's disease** is the most common form of dementia and is responsible for about 75% of cases. Dementia is a frequent complication of **Parkinson's disease** (PD) and often a late symptom. Studies show that a significant proportion of patients with PD has some form of cognitive impairment at the time of PD diagnosis. **Huntington's disease** is a disease that causes abnormal movements and co-ordination difficulties, along with cognitive problems. It is a progressive condition that usually begins in middle age. Cognitive changes often occur early on and dementia is a common feature in about 50% of people with advanced Huntington's disease. The carboxyl terminus of Hsp70-interacting protein (**CHIP**) plays a vital role in maintaining the protein homeostasis in the cytoplasm. Studies showed that CHIP can bind to cellular membranes under conditions of acute stress, serving as a proteostasis sensor. Once docked to the membrane, CHIP may alter protein homeostasis of the cell. This might then, affect cell survival. Previous studies have confirmed that oxidative stress plays a central role in a common pathophysiology of neurodegenerative diseases – such as Alzheimer's disease and Parkinson's disease. CHIP is known as a protector of neurons and central nervous system's cells from oxidative stress.

In this project, we will be working on SH-SY5Y cells. They are human neuroblastoma cell lines, used to model neurodegenerative diseases. You will learn how to **culture cells** and how to work under **biological safety cabinet**. In order to mimic neurodegenerative diseases conditions in cells, we will use tBHP compound to induce oxidative stress in our cells. Next, you will learn how to prepare samples for **Liquid Chromatography Mass Spectrometry** (LC/MS) Analysis. It separates compounds within a sample and the mass spectrometer provides data which can help provide structural identity of the compound. Samples will be then processed and analysed by the Mass Spectrometry team in our Centre and we will together analyse the obtained results. The rest of the cells will be analysed with use of **Western Blotting Technique**. In this technique a mixture of proteins is separated based on molecular weight, and thus by type, through gel electrophoresis. These results are then transferred to a membrane producing a band for each protein. This will help us discover, what is the role of CHIP protein in the oxidative stress conditions and therefore, what crucial role it plays in the development of various neurodegenerative diseases, such as Alzheimer's disease or Parkinson's Disease.

GENERAL INFORMATION

Application of oxidative stress



Working group- the team of diverse and highly motivated professionals coming from different scientific backgrounds. The collaborative, inclusive and innovative nature of ICCVS will make you feel welcome during your stay in Poland.

Region- ICCVS is located in the very heart of the Gdańsk. Gdansk is located on the Baltic coast, right by the sea. It is Poland's principal seaport and the centre of the country's fourth-largest metropolitan area. The city lies in a conurbation with the city of Gdynia, town of Sopot, and suburban communities, which together form a metropolitan area called the Tricity (Trójmiasto), with a population approaching 1.4 million. This gives you plenty of possibilities to have fun! Whereas Gdańsk offers you beautiful historical old town, just within 15 minutes SKM train ride you can reach Sopot, the Baltic Sea spa town with beautiful beaches and the longest wooden pier in Europe! If you decide to hop on a train again, after 10 minutes you can reach Gdynia – a very modern city with thriving cultural life, beautiful boulevard and plenty of charming restaurants and cafes. Gdansk itself has a population of 460,427, making it the largest city in the Pomerania region of Northern Poland.