

Multiple myeloma is a blood marrow cancer. It is an incurable disease that causes renal failure, anemia, and bone destruction. It originates from the cells that normally are very good to the organism because they produce antibodies that protect us from other diseases. We don't know why those cells become dangerous to the patient, although in the last decades a lot of progress has been made, and we understand better this disease. Myeloma is highly diverse, not only varies between patients but also in one patient many distinct types of cells are present. This diversity makes the disease very difficult to treat. We destroy one part, and the other part, that was insensitive to the treatment grows again and the patients suffer from the relapse of the disease. Every time the relapse occurs it is more difficult to treat the patient, as the drugs are less effective. For all this, it is important to keep investigate why multiple myeloma occurs. We need to know what are the causes that it is so aggressive disease. And if we find some factors that could be responsible for it, we need to check if we would be able to block it somehow. Many of those factors are oncogenes, which means that their activity promotes cancer.

Since the scientific investigation is a continuous process, we also base our research on our previous work. We have previously asked if we can measure inside myeloma cells the level of multiple proteins, that could be important to this disease. To do this, we set up a new technique and later applied it in a large group of patients. We saw that a high level of one protein was particularly bad for the patients. This protein is gankyrin. It is not the first time that we came across this protein. We investigated previously the mechanism of its regulation in myeloma cells, but in that moment we did not have tools to study it. Why it is so important to study gankyrin in myeloma?

The response is simple because this protein degrades good proteins and stabilizes other ones. In this way, it leads to the development of cancer, as has already been set up in solid tumors. In hematological cancers, it was never investigated.

How do we want to do it? We will use highly advanced techniques that allow us in myeloma cells that we cultivate in the laboratory to modify the level of this protein- we can turn it off completely, or only weaken its level. Then, we will check how the information that is continuously flowing inside the cells is affected. This will give us knowledge about how gankyrin protein is important for myeloma cells, and how it is responsible for them to be so bad.

Then, we would like to check how its presence or level changes the response of the cells to the treatment. Also, we know that it is possible to block this protein with some chemical substances. Thus, we will check if this substance kills myeloma cells, and how it could be incorporated together with the drugs that are already used.

Finally, we want to check if a high level of gankyrin protein indicates a bad prognosis independently on the treatment or is bad only in the case of some treatments. We want also to check how it changes during the disease. With this information, we will know for which patients in the future, the blocker of gankyrin could give more effect.

All the results will give us more information about the nature of this incurable disease and could bring in the future new drug to treat multiple myeloma