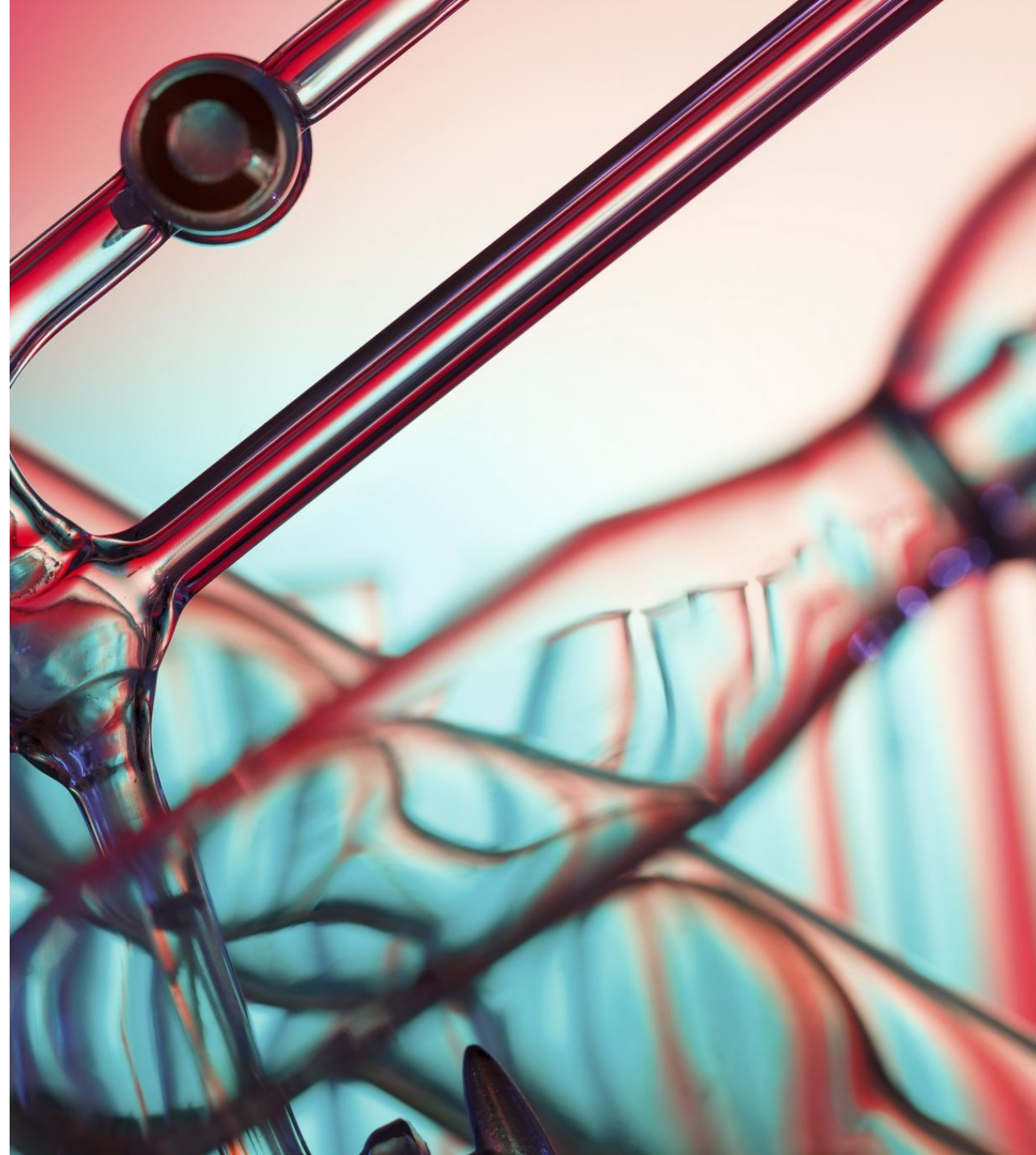


Summary of the international traineeship at the Polytechnic University of Catalonia

Beata Drzewiecka

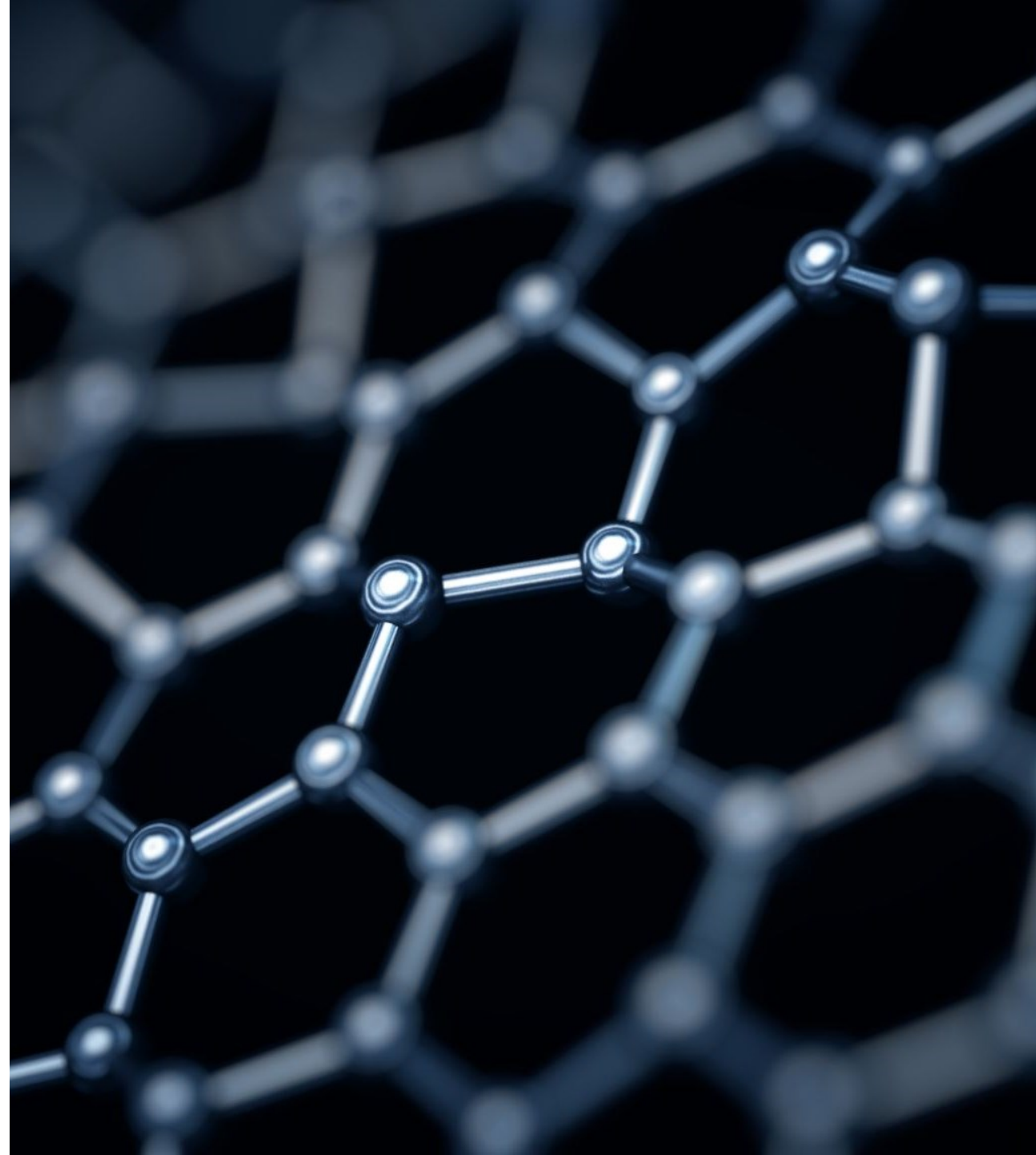
Modification of Hydrogel Biomaterials with Cold Plasma

- This year I had the pleasure of participating in the Erasmus+ program and doing an internship at the Polytechnic University of Catalonia in Barcelona. The topic of my internship was the modification of hydrogel biomaterials with cold plasma. In this presentation, I will present the results of my research.



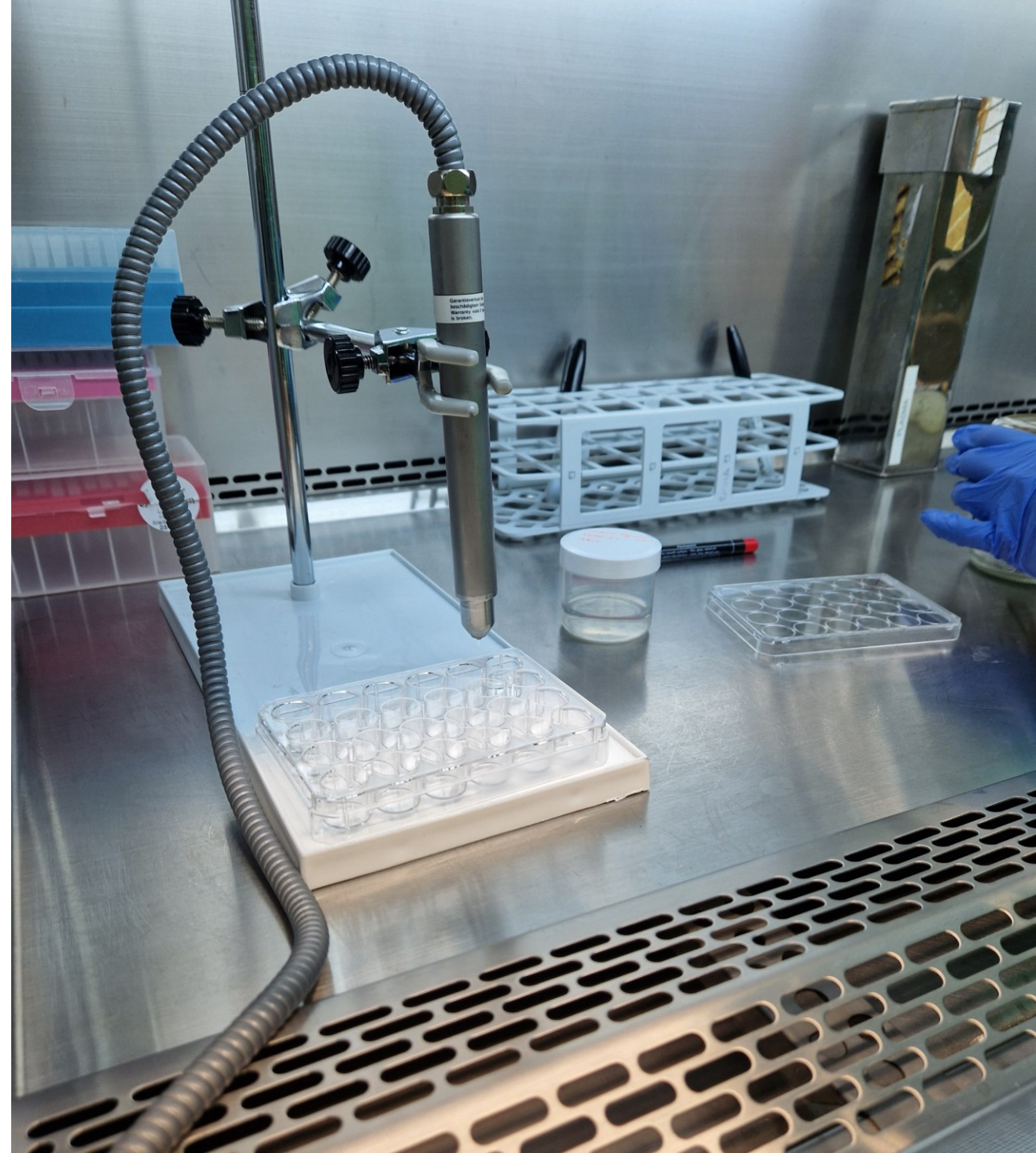
What are hydrogel biomaterials?

- Hydrogel biomaterials are a fascinating material with great potential for biomedical applications. They are biocompatible, which means they can be safely used in the human body. They consist of a network of polymers and water, which makes them soft and flexible. Hydrogel biomaterials can be used to create scaffolds for tissue engineering, deliver drugs to the body, and regenerate damaged tissues. There are many different types of hydrogel biomaterials, and each one has its own unique properties. Hydrogel biomaterials can be modified by various methods to improve their properties and tailor them to specific applications.



What is cold plasma?

- Cold plasma is another fascinating material with great potential for biomedical applications. It is an ionized gas with a temperature lower than room temperature. Cold plasma can be generated by various methods, such as glow discharge or microwave discharge. Cold plasma has many properties that are beneficial for biomedical applications. It has antibacterial activity, which means it can kill bacteria. It also has anti-inflammatory activity and stimulates cell growth. These properties make cold plasma a promising material for modifying hydrogel biomaterials.





Modification of hydrogel biomaterials with cold plasma

- Cold plasma can be used to modify hydrogel biomaterials in a variety of ways. It can improve their mechanical properties, such as tensile strength and Young's modulus. This means that the hydrogel biomaterials will be stronger and more resistant to tearing. Cold plasma can also improve the biocompatibility of hydrogel biomaterials. This means that they will be more compatible with the human body and less likely to cause an immune response. Cold plasma can also improve the surface properties of hydrogel biomaterials. This can make them more hydrophilic or hydrophobic, which can affect their interactions with cells and other materials.

Objectives of my internship



The objective of my internship was to investigate the effect of cold plasma modification on the properties of hydrogel biomaterials.



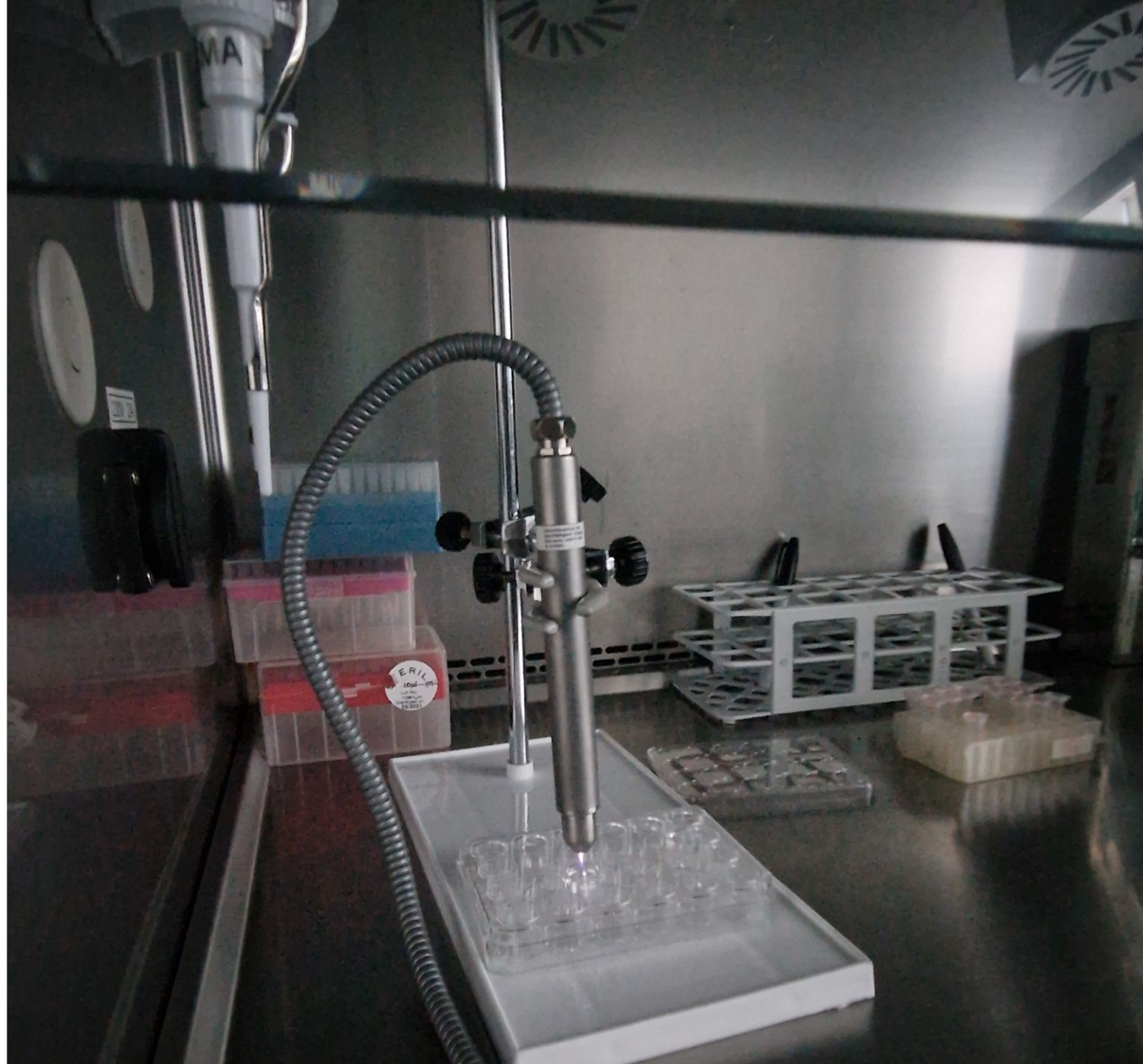
I focused on two types of hydrogel biomaterials: sodium alginate and chitosan.



I modified the hydrogel biomaterials with cold plasma at different parameters and evaluated their mechanical properties, biocompatibility, and surface properties.

Research Methods

I used a Cold atmospheric plasma (CAP) to modify the hydrogel biomaterials



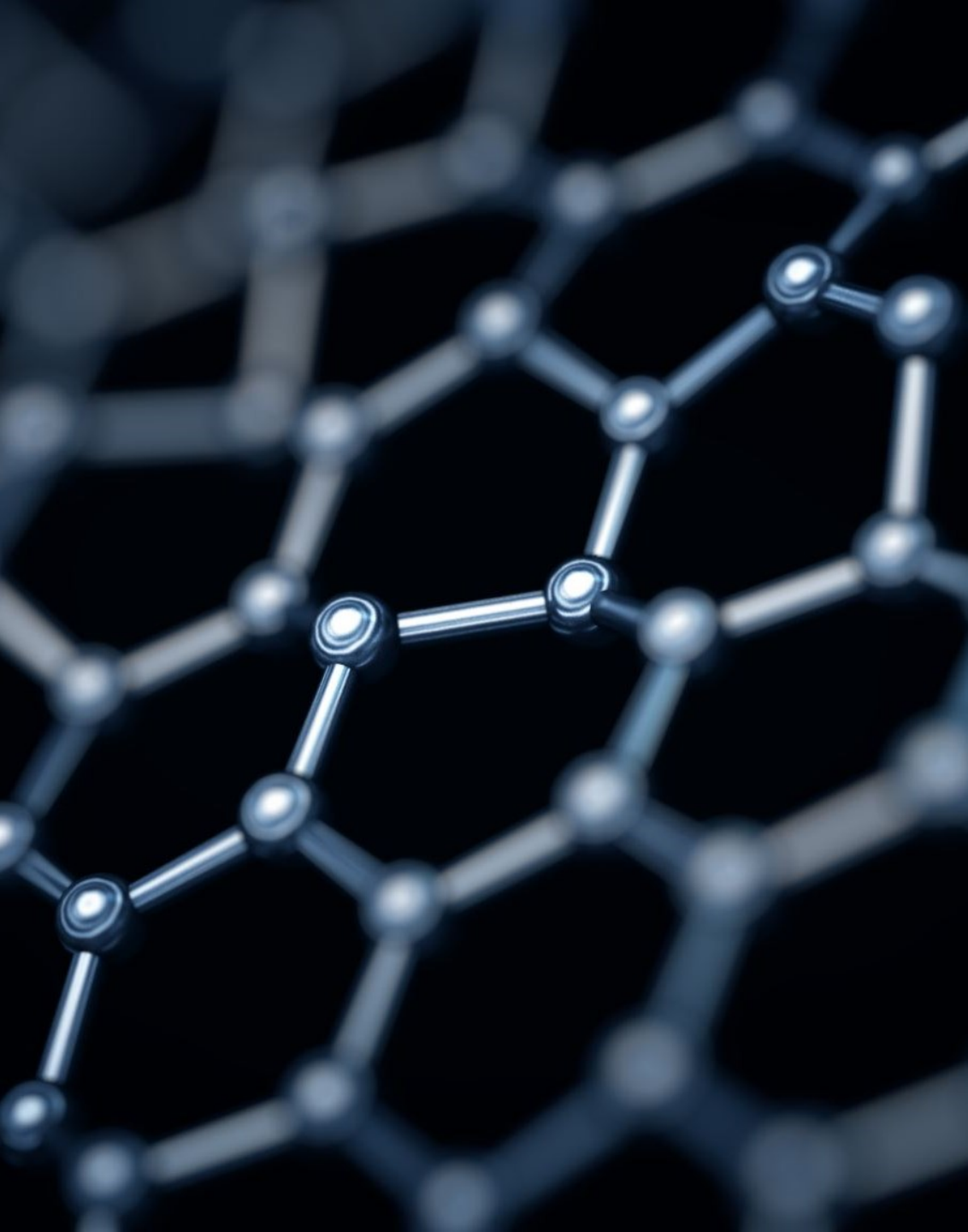
Results



Cold plasma modification improved the mechanical properties of the hydrogel biomaterials.



Cold plasma-modified hydrogel biomaterials had higher tensile strength and Young's modulus than non-modified hydrogel biomaterials.



Conclusion

- In conclusion, this research showed that cold plasma modification is a promising method for modifying hydrogel biomaterials for biomedical applications. Cold plasma-modified hydrogel biomaterials have higher tensile strength, Young's modulus, and biocompatibility than non-modified hydrogel biomaterials. These properties make cold plasma-modified hydrogel biomaterials more useful for applications such as tissue engineering, drug delivery, and regenerative therapy.



What my Erasmus+ internship at the Polytechnic University of Catalonia gave me

- The Erasmus+ internship at the Polytechnic University of Catalonia was an incredibly valuable experience for me. I gained valuable experience in biomaterials research. I learned new biomaterials modification techniques, such as cold plasma modification. I met new people from different countries and cultures. I improved my language skills, both English and Spanish. I became more independent and self-confident. I am very grateful for the opportunity to participate in this program, and I recommend it to all students who want to gain international experience and develop their skills.

Thank you for
your attention!

