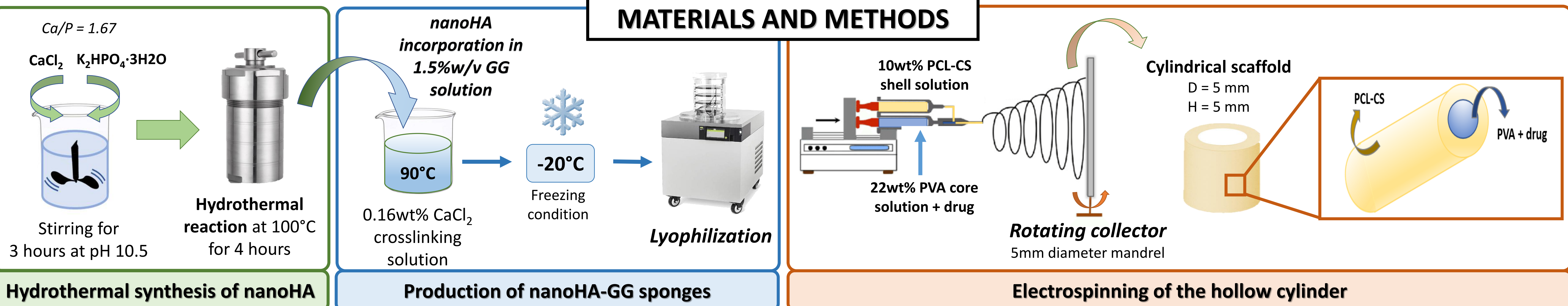


## INTRODUCTION

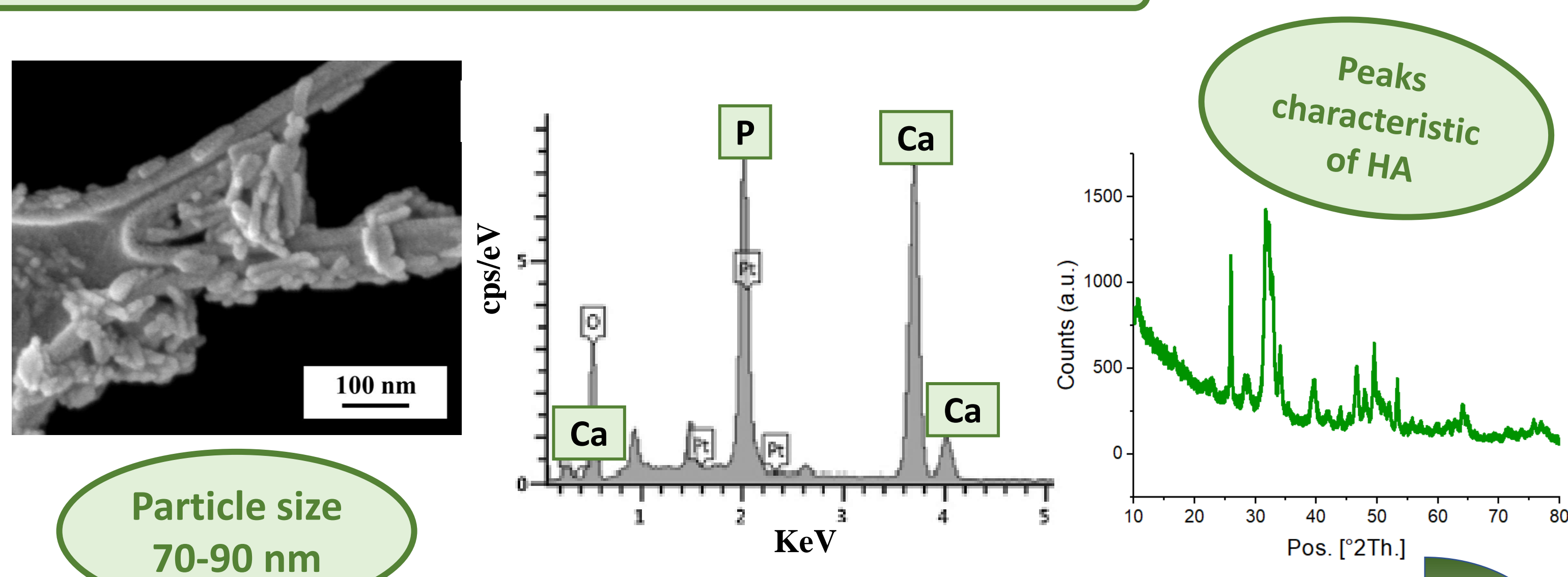
Osteosarcomas (OS) are highly aggressive tumours with a significant prevalence in paediatric patients [1]. OS's therapy usually involves surgery to eradicate tumour mass and subsequently eliminate any residual cells through the administration of chemotherapeutic drugs. OS surgical resection creates large bone defect, therefore there is a considerable interest in developing new strategies for the design of bone substitutes that can fill the void left by the surgical operation and support bone regrowth. Moreover, in order to prevent tumour recurrence several strategies for the release of drugs have been extensively explored.

In this research, a bi-functional device composed of a gellan-gum (GG) sponge embedding nano hydroxyapatite (nanoHA) and surrounded by an electrospun, core-shell, membrane has been developed. The electrospun shell is composed of a poly( $\epsilon$ -caprolactone) (PCL) and chitosan (CS) blend, while the core consists of polyvinyl alcohol (PVA) for loading a drug (N-acetylcysteine as a model). The chosen biomaterials are polymers that have widely shown their potentiality in regenerative medicine approaches [2]; the nanoHA has been added for its osteoconductive properties and its similarity to the natural bone mineral phase [3].

## MATERIALS AND METHODS

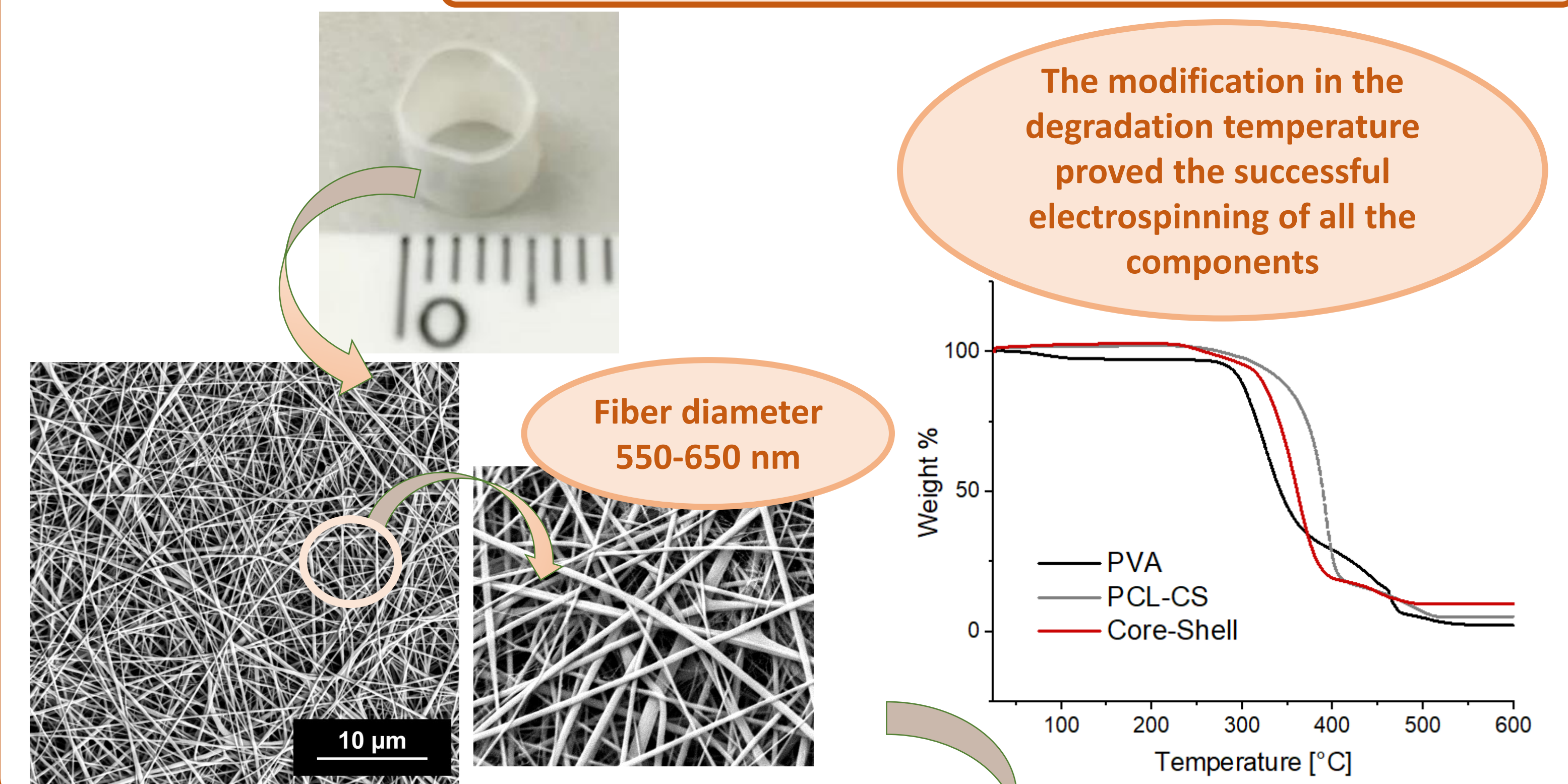


## Nanosized hydroxyapatite characterization

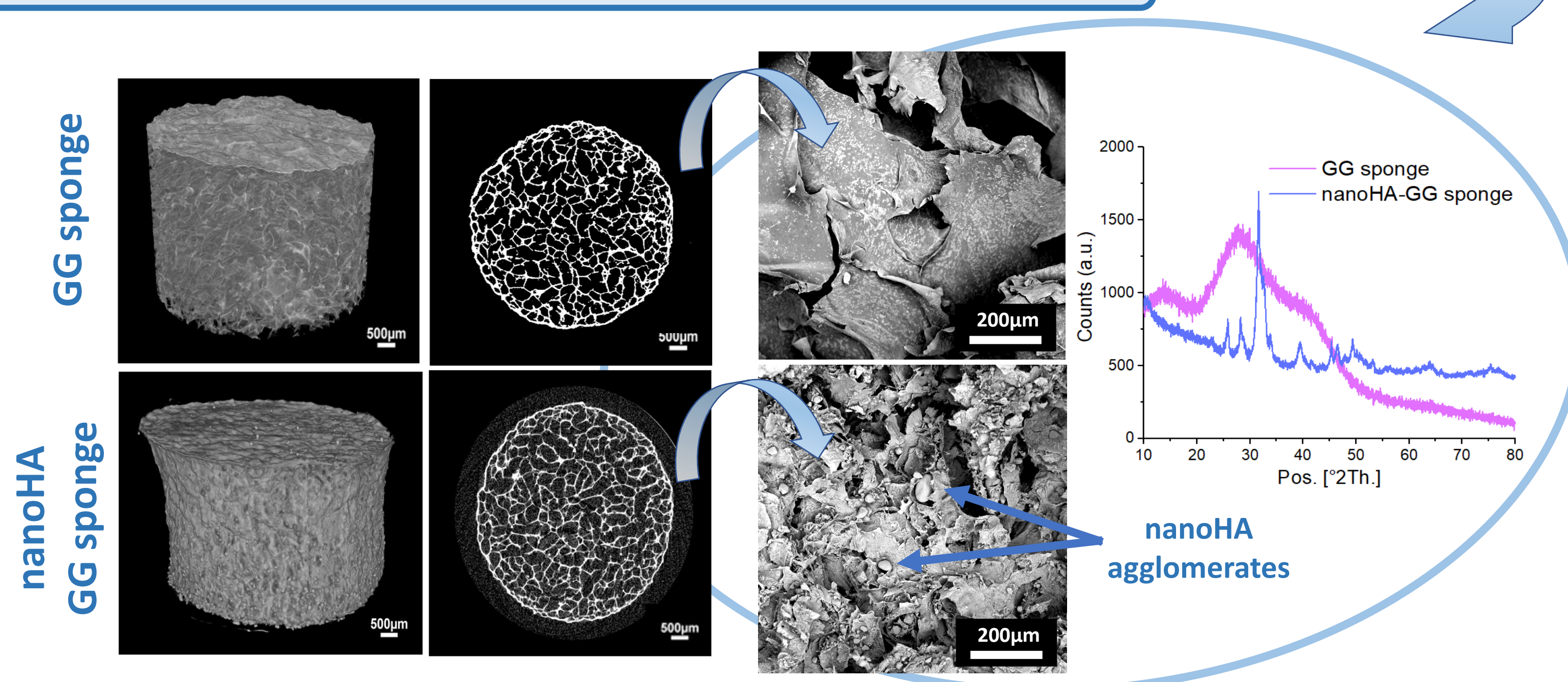


## RESULTS

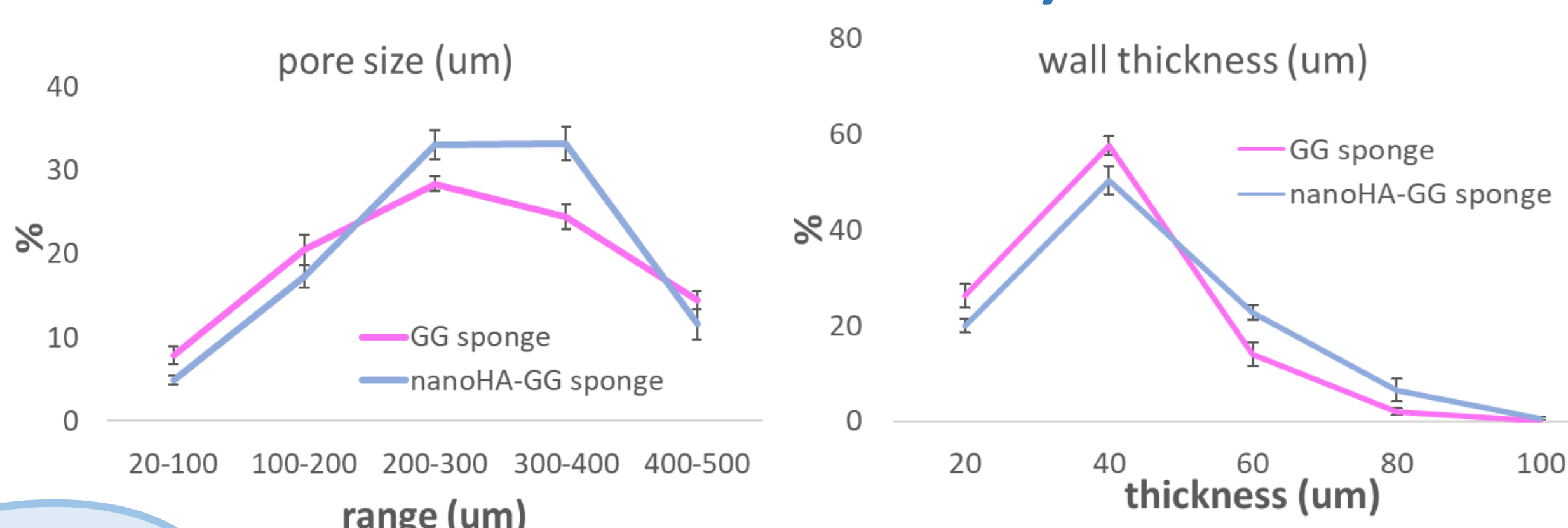
## Characterization of the electrospun scaffold



## Characterization of the nanoHA-GG sponges



## Microstructural analysis

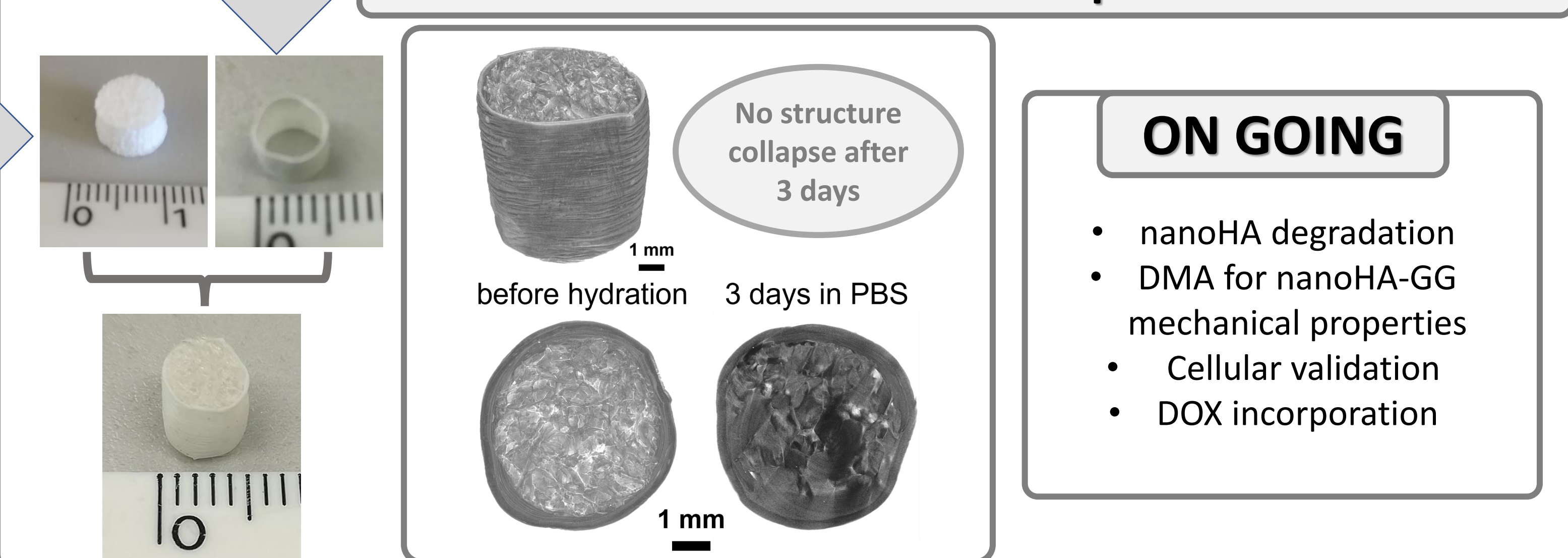


Pore size range 200-400 μm

	GG sponge	nanoHA-GG sponge
Total porosity	88.33 ± 0.84 %	87.04 ± 0.81 %

\*n=3

## Construction of the bi-component scaffold



## CONCLUSIONS

- NanoHA-GG sponges with a uniform inorganic phase distribution and suitable pore dimension for cellular colonization have been produced by means of lyophilization.
- Tubular electrospun scaffolds with a fiber dimension of around 550-650 nm were prepared and preliminary results proved a sustained drug release over time.
- The combination of the scaffolds produced by two different processing techniques allowed to obtain a bi-component platform that will be able to sustain bone regrowth while releasing drugs to avoid tumoral relapse.

## REFERENCES

1. Rickel K., Fang F., Tao J., Bone, 102:69-79, 2017
2. Shi C., Yuan Z., Han F., Zhu C., Li B., Annals of Joint, 1:27-27, 2016
3. Costa L., Silva-Correia J., Oliveira M., Reis R., Osteochondral Tissue Engineering, 1058:281-304, 2018