

### INTRODUCTION & AIM

Osteosarcoma is a type of bone cancer that occurs mainly in children, adolescents, and young adults, producing malignant bone tumors. Conventional treatments for this type of cancer have limitations.

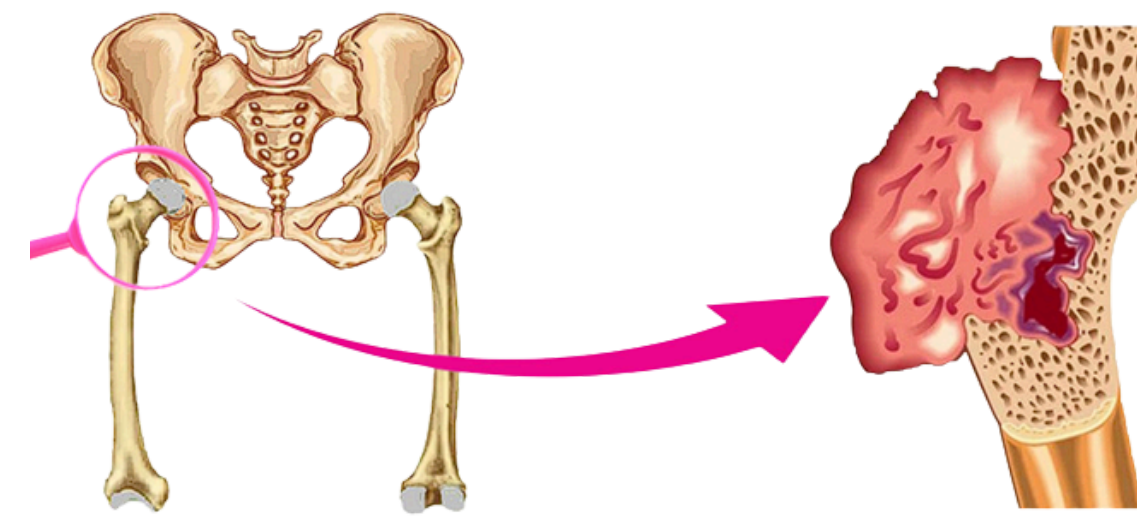


Figure 1. Bone neoplastic process located in the proximal femur

Curcumin (CUR) is a natural medicine with pharmacological activity, notable for its antioxidant and anticancer properties.

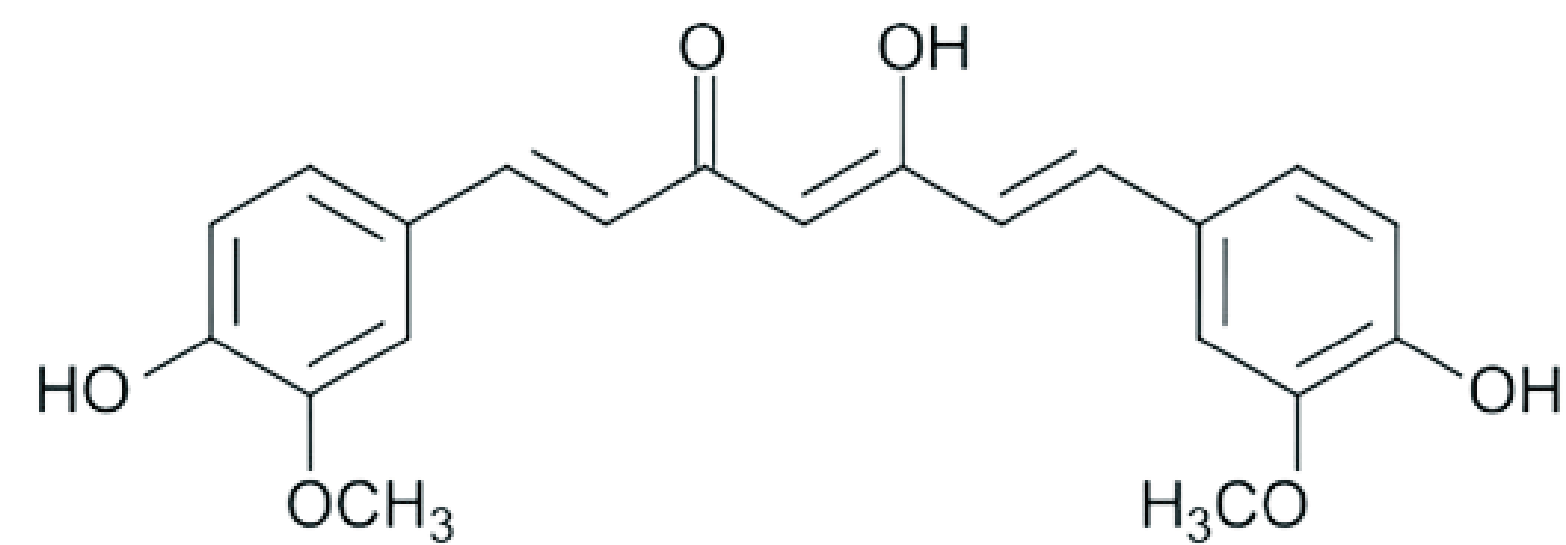


Figure 2. Structure of curcumin in enol configuration.

Studies have demonstrated greater safety and efficacy of drugs loaded onto graphene oxides (GO) functionalized with carboxyl groups (COOH).

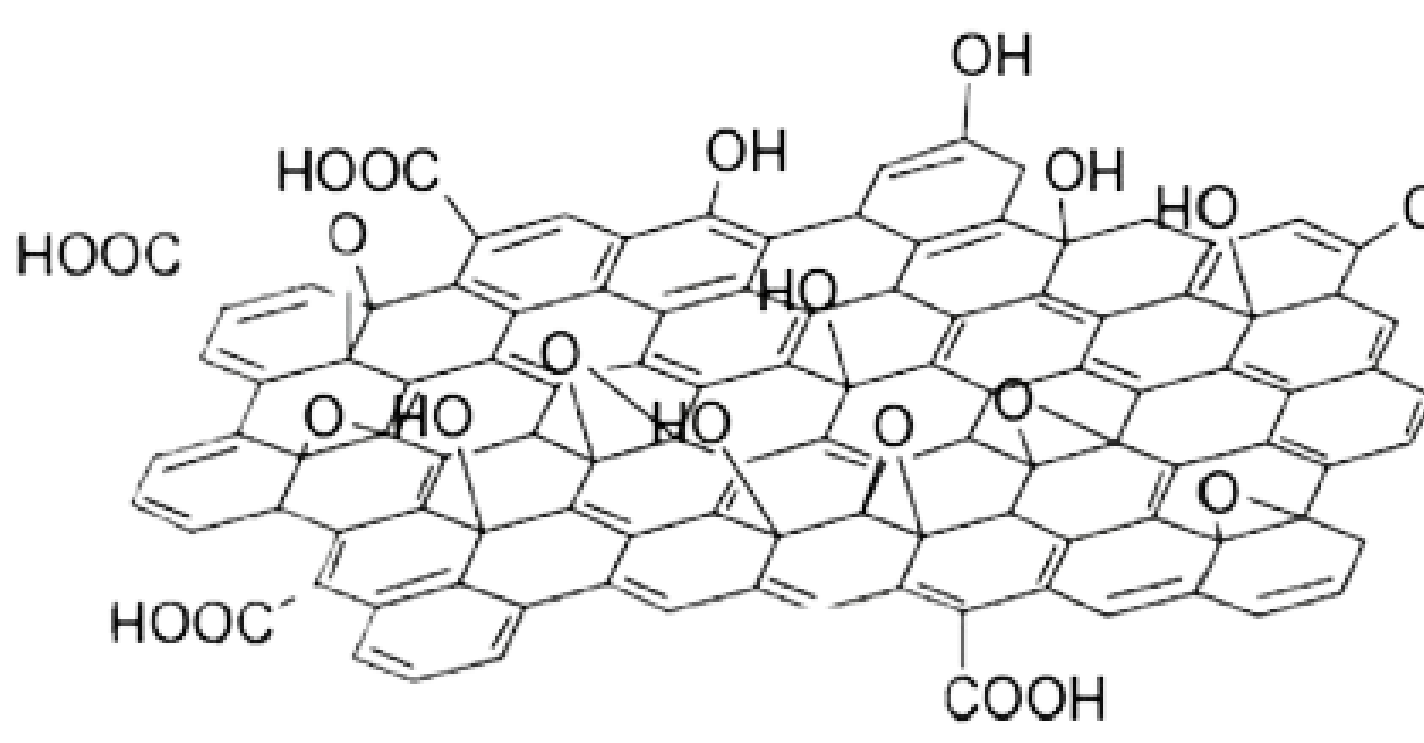
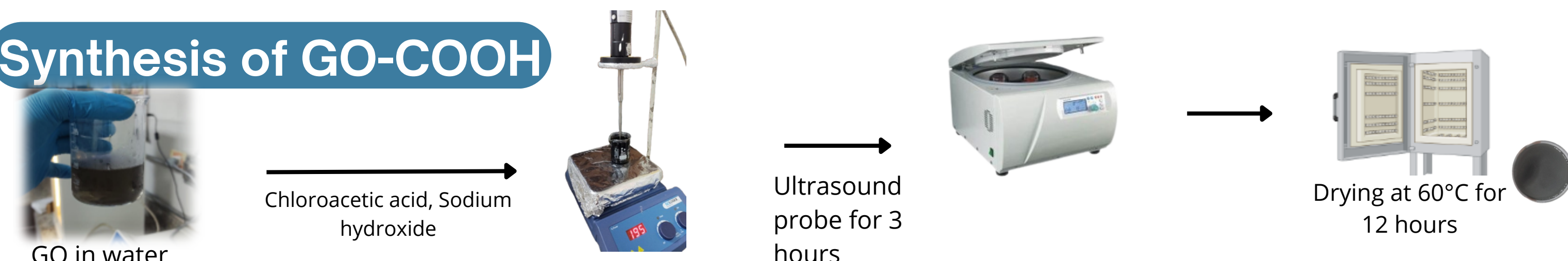


Figure 3. Structure of graphene oxide

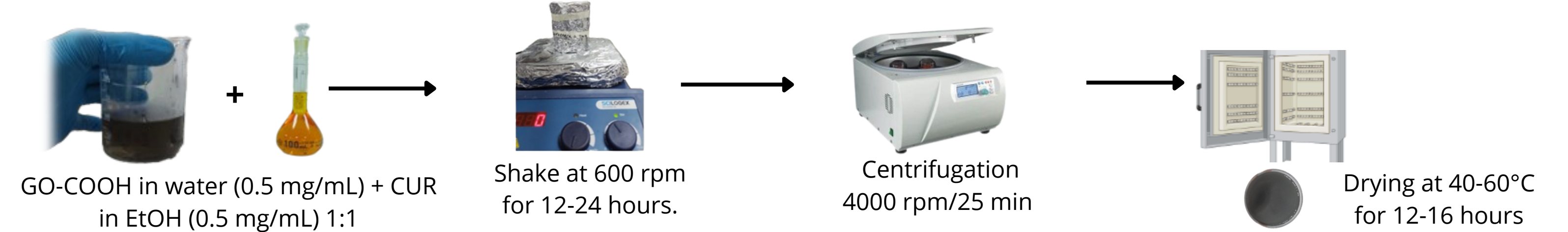
Therefore, the aim is to synthesize and evaluate the therapeutic potential of a carboxylated graphene oxide-curcumin (GO-COOH-CUR) nanoadduct using in vitro assays for the treatment of osteosarcoma.

### METHOD

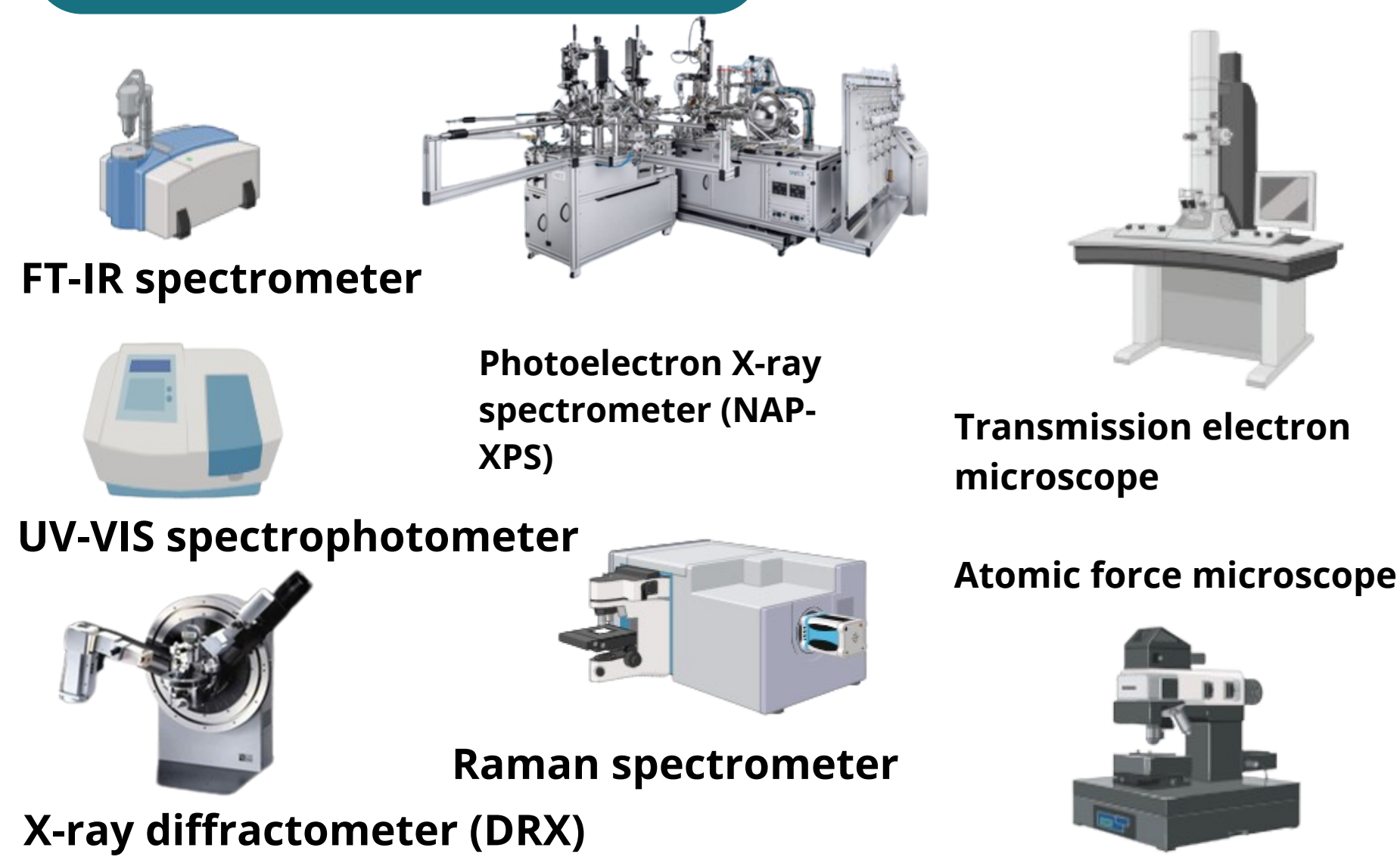
#### Synthesis of GO-COOH



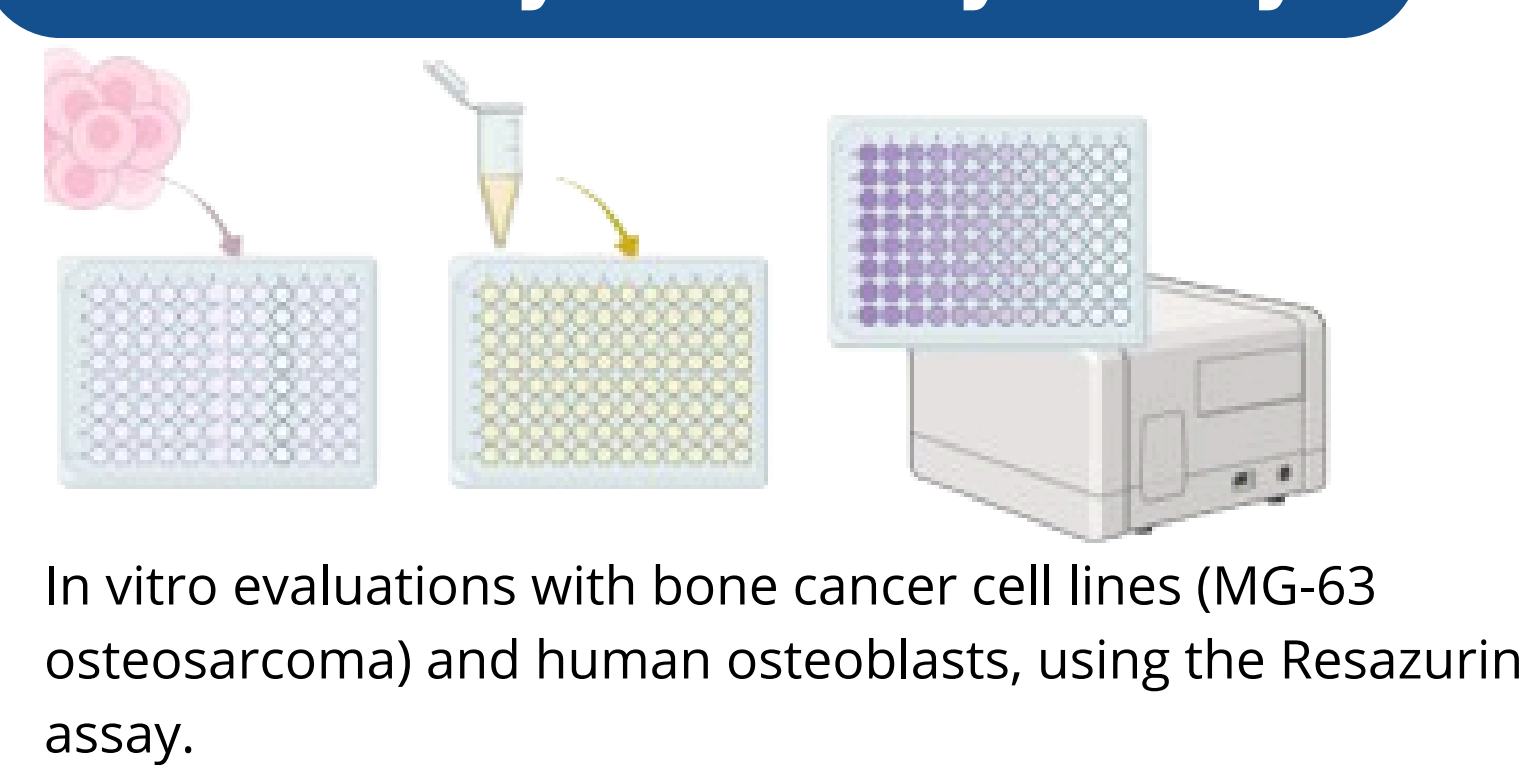
#### Synthesis of GO-COOH-CUR



#### Characterization



#### In vitro cytotoxicity assay



### RESULTS

**Table 1.** A) Analysis of the intensities of the D, G, and 2G bands by Raman spectroscopy. B) Analysis by X-ray diffraction. C) Elemental composition determined by XPS.

| B | A            |          |              |        |       |
|---|--------------|----------|--------------|--------|-------|
|   | Nanomaterial | ID/IG    | I2D/IG       | La(nm) |       |
|   | GO           | 0.81     | -            | 23.82  |       |
|   | GO-COOH      | 1.43     | 0.13         | 13.39  |       |
| B |              |          |              |        |       |
|   | Nanomaterial | FWHM (°) | Angle 2θ (°) | d(nm)  | H(nm) |
|   | GO-COOH-CUR  | 5.68     | 25.67        | 0.35   | 1.50  |
|   | GO-COOH      | 3.76     | 25.72        | 0.35   | 2.27  |
| B |              |          |              |        |       |
|   | GO           | 0.90     | 9.91         | 0.89   | 9.25  |

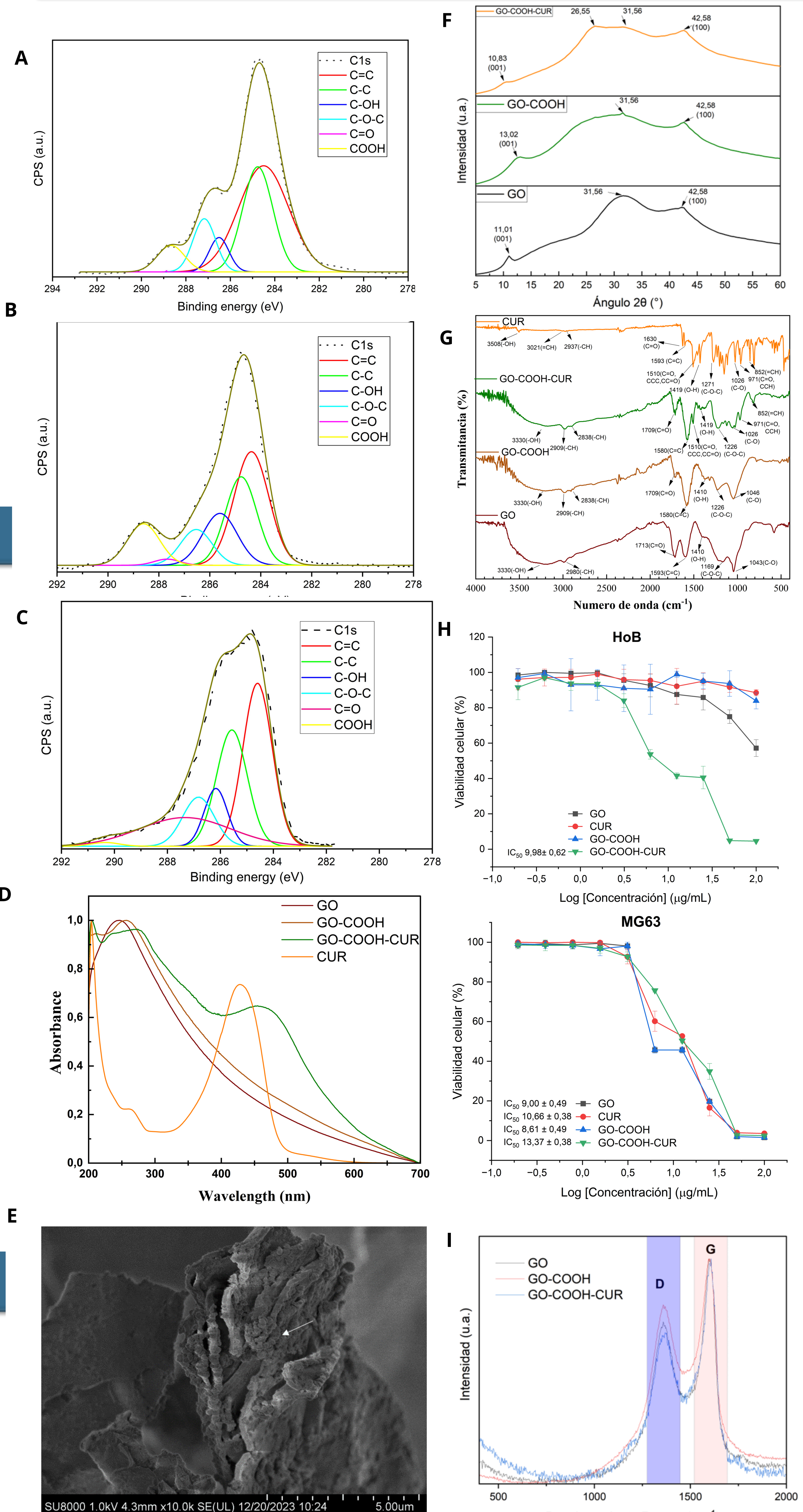
| C |              |         |         |       |
|---|--------------|---------|---------|-------|
|   | Nanomaterial | C1s (%) | O1s (%) | O/C   |
|   | GO-COOH-CUR  | 80,481  | 17,299  | 2,22  |
|   | GO-COOH      | 64,836  | 25,492  | 9,672 |
| C |              |         |         |       |
|   | GO           | 73,650  | 22,703  | 3,647 |

### CONCLUSION

- Each modification of GO shows alterations in its chemical and structural composition, due to the elimination of oxygenated groups and the inclusion of COOH and CUR groups.

- The nanoadduct demonstrated good cytocompatibility and cytotoxic activity against osteosarcoma. We propose optimizing the formulation between CUR and GO-COOH and using photothermal therapy to improve the anticancer activity of the adduct.

### RESULTS & DISCUSSION



**Figure 4.** A, High-resolution C1s XPS spectrum of GO; B, High-resolution C1s XPS spectrum of GO-COOH; C, high-resolution C1s XPS spectrum of GO-COOH-CUR; D, UV-vis spectrum of GO, GO-COOH, and GO-COOH-CUR; E, SEM image of GO-COOH-CUR; F, diffraction of GO, GO-COOH, and GO-COOH-CUR; G, FTIR spectrum of GO, GO-COOH, and GO-COOH-CUR; H, cell viability of GO, GO-COOH, and GO-COOH-CUR against HoB and MG-63; I, Raman spectrum of GO, GO-COOH, and GO-COOH-CUR.

#### FUTURE WORK / REFERENCES

