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Meeting 2
Edinburgh, 3rd February 2020

Innovative Training Networks (ITN) – Marie Skłodowska-Curie Actions
H2020-MSCA-ITN-2017 (THERACAT-765497)

An 3D in-vitro cancer model for chemotherapy testing

Objectives:

1. Customization of hydrogels capable of mimicking **cancerous tissue**.
2. **In vitro 3D** cancer models as **drug-testing platforms**.
3. Insight into the possibility of our hydrogels to act as **drug nanocarriers**.

An 3D in-vitro cancer model for chemotherapy testing

Foreseen research

Year 1

Customization of hydrogels capable of mimicking **cancerous tissue:**

- Parametre adjustment:
  - **MCF7** breast cancer cell line.
  - unfunctionalized or **RGD** biofunctionalized hydrogels.
  - Optimization of **stiffness** and cell density.
- Evidence of cell viability and correct morphology.
- Evidence of correct functionality: qPCR.
- Started with 2D and proceeded with 3D.

Year 2

Advanced 3D modelling:

- Co-culture of different cell lines encapsulated in spheroids. E.g. MCF7 and CAFs.
- MDA-MB-231 highly invasive breast cancer cell line.

Synthesis of **gel-based catalyst carriers (TUE).**

Year 3

In vitro 3D cancer models as **drug-testing platforms**:

- Nanoparticle delivery assessment through STORM **(IBEC).**

Results obtained

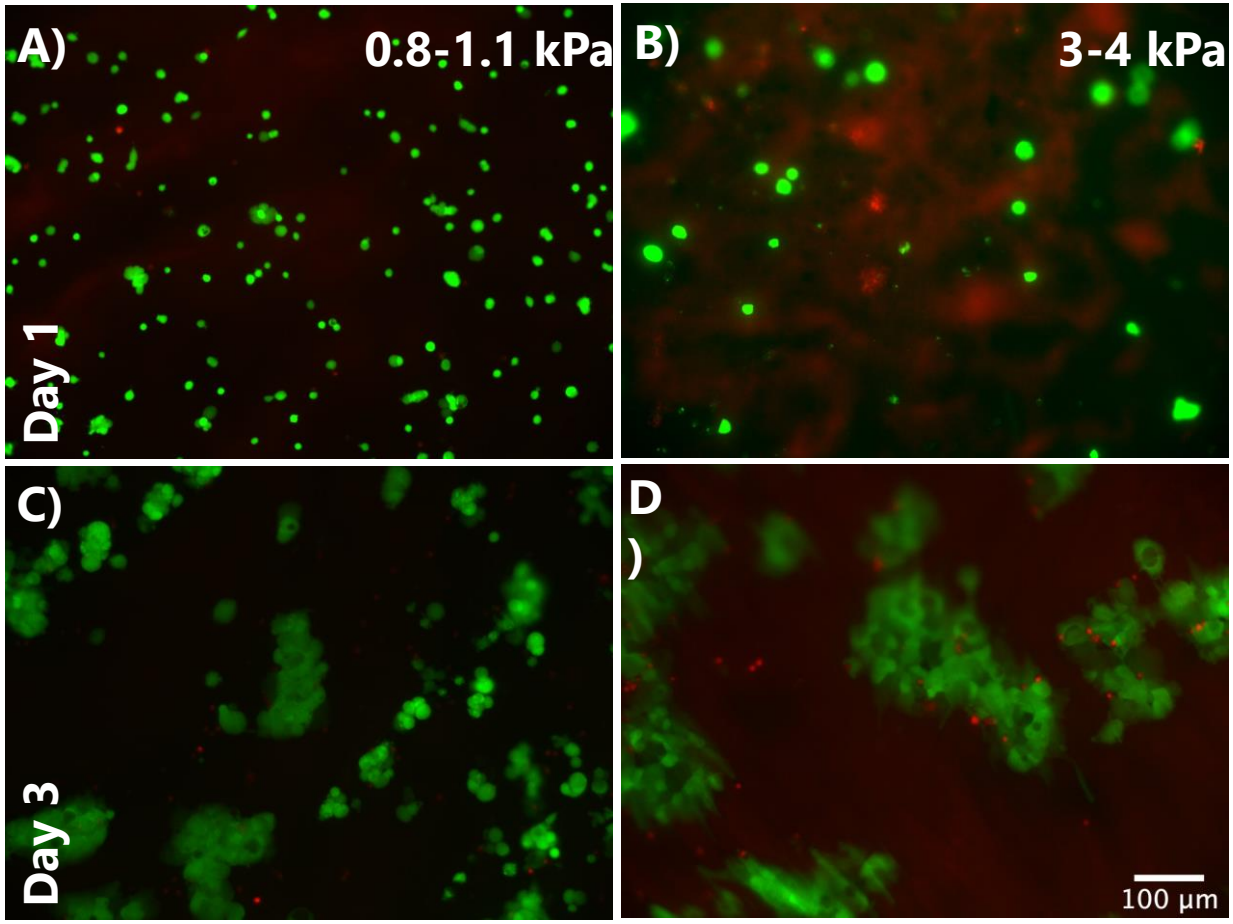


Figure 1: 25 x 10^3 MCF7s/cm^2 were seeded **<u>on</u> 0.8-1.1** and **3-4 kPa Biogelx-RGD biofunctionalized hydrogels**. On **days 1** and **3,** cells where stained with Calcein and Ethidium Homodimer and observed at a fluorescence microscope. Representative images; scale bar = 100 µm; N=3. **Cells were viable developed a characteristic morphology and clustered.**

Day 1.

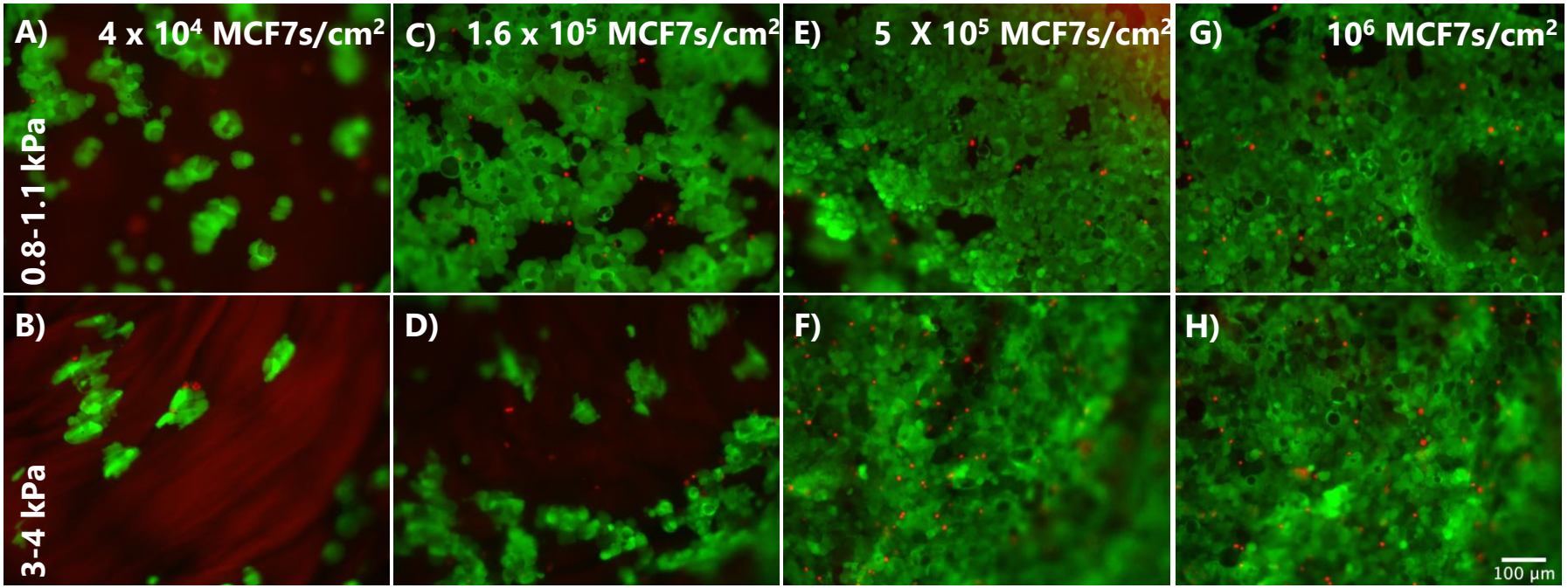


Figure 2: 4x 10^4, 1.6 x 10^5, 5 x 105, and **10^6 MCF7s/cm²** were seeded **<u>on</u> 0.8-1.1** and **3-4 kPa Biogelx-RGD hydrogels**. On **day 1**, cells where stained with Calcein and Ethidium Homodimer. Scale bar=100 µm; N=1 . **Cells were viable, developed a characteristic morphology and clustered.**

Day 3.

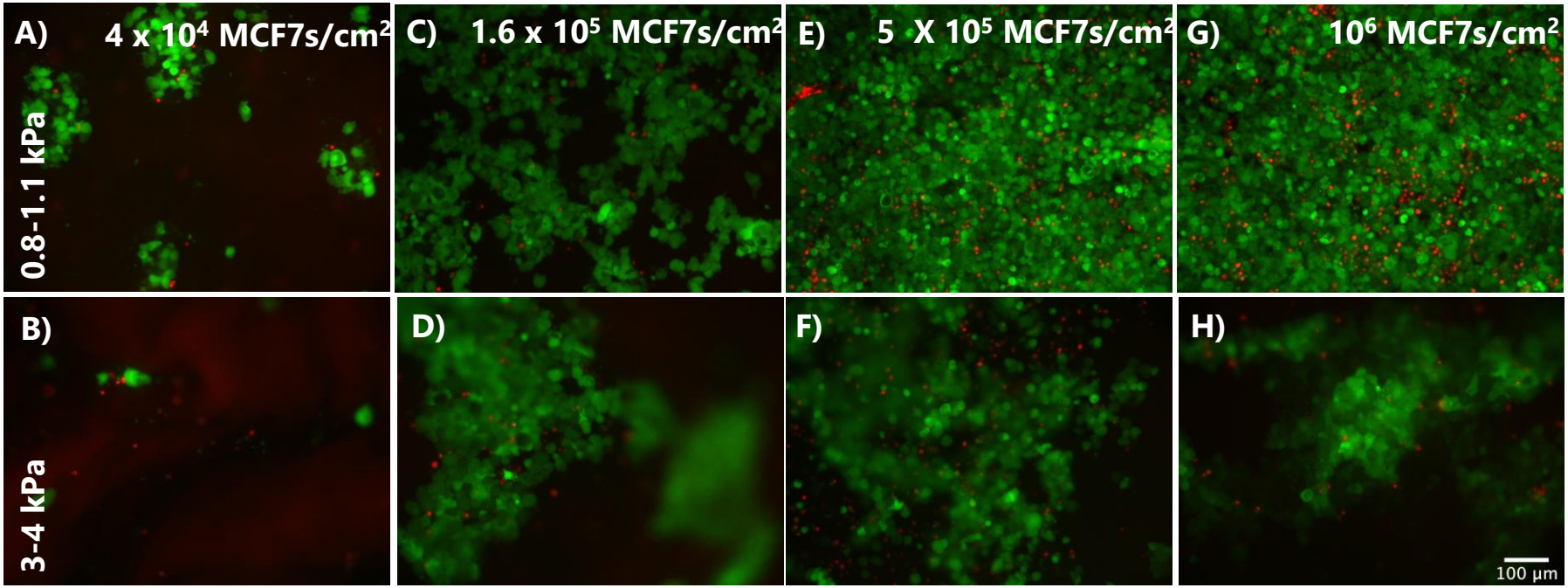


Figure 3: 4x 10^4, 1.6 x 105, 5 x 10^5 and **10^6 MCF7s/cm²** were seeded **<u>on</u> 0.8-1.1** and **3-4 kPa Biogelx-RGD biofunctionalized hydrogels**. On **day 3**, cells where stained with Calcein and Ethidium. Scale bar=100 µm; N=1 . **Cells were viable, developed a characteristic morphology and clustered.**

Day 1

Day 3

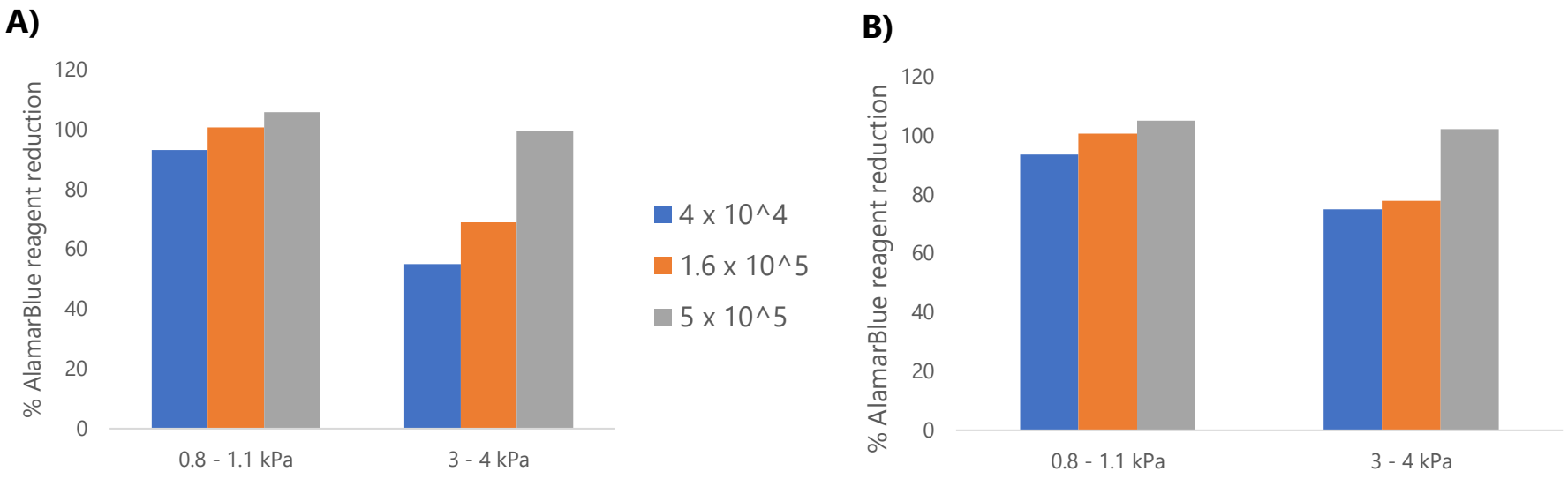
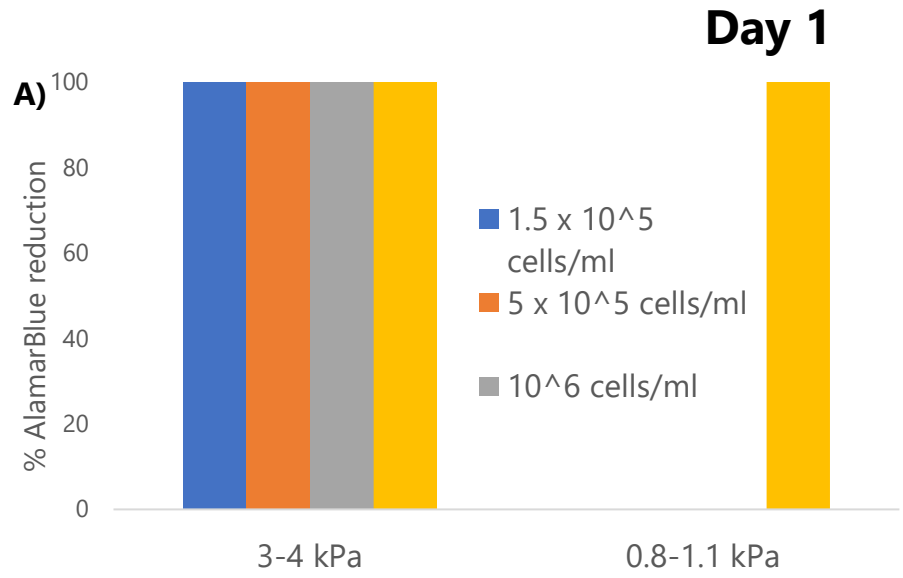
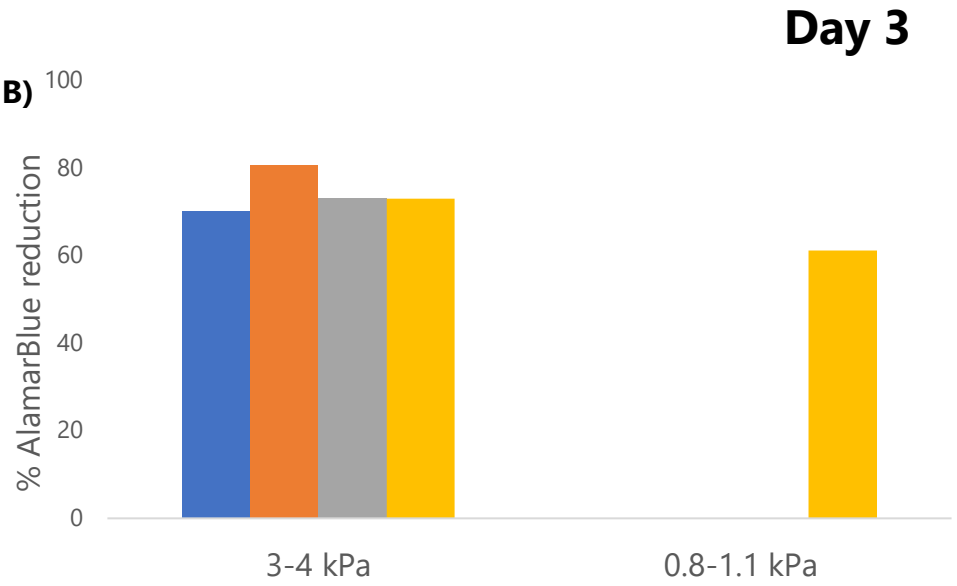


Figure 4: Percentage of AlamarBlue reduction as an indicator of cell viability. **4x 10^4, 1.6 x 10^5** and **5 x 10^5 MCF7s/cm^2** were seeded **<u>on</u> 0.8-1.1** and **3-4 kPa Biogelx-RGD hydrogels**. **1 and 3 days later**, the same plate was incubated in AlamarBlue reagent for 4 hours. Absorbances at 570 and 600 nm were measured afterwards. N=1**. Cell viability** was **corroborated**. AlamarBlue reagent was reduced **up to an extend of ~100% by cells on 0.8-1.1 kPa gels** at the applied densities and **on 3-4 kPa gels at the highest cell density.**

Results obtained





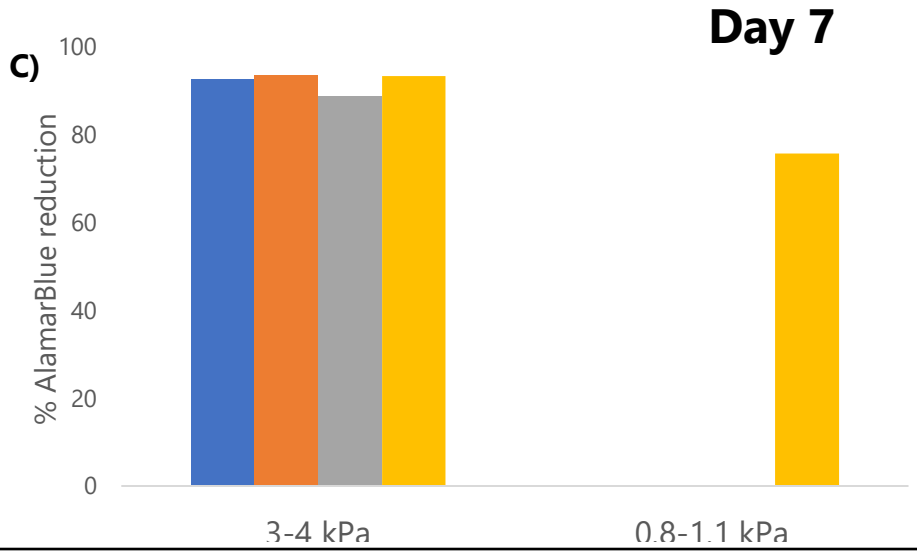


Figure 5: Percentage of AlamarBlue reduction as an indicator of cell viability. **1.5x 10^5, 5 x 10^5, 10^6** and **3.5 x 10^6 MCF7s/ml** were seeded in **3-4 kPa Biogelx-RGD hydrogels**. **3.5 x 10^6 MCF7s/ml** were also seeded in **0.8-1.1 kPa** hydrogels. **1, 3 and 7 days later**, the same plate was incubated in AlamarBlue reagent for 4 hours. Absorbances at 570 and 600 nm were measured afterwards. N=1. **Cells were viable in all gels from days 1 to 7.** AlamarBlue reagent was reduced **up to an extend of ~100% by cells seeded in 3-4 and 0.8-1.1 kPa gels.**

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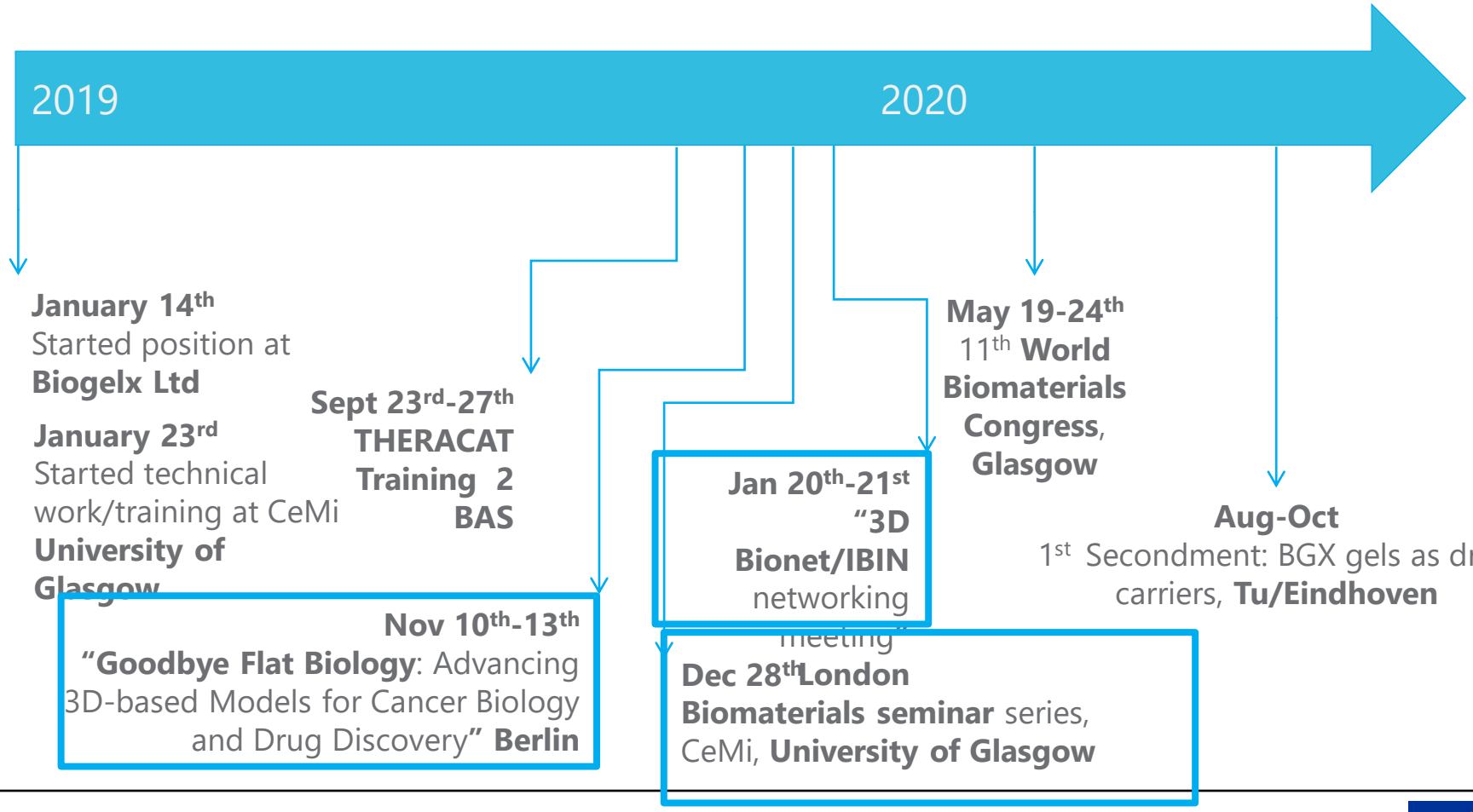
Scientific and Transversal Skills Training



News on beneficiaries' websites:

https://www.biogelx.com/advancing-3d-models-for-defeating-cancer/
https://www.biogelx.com/biogelx-tumor-model-for-chemotherapy-testing/
https://www.biogelx.com/goodbye-flat-biology-biogelx-tumor-model-for-chemotherapy-testing/

Updates on social networks:

https://www.linkedin.com/posts/biogelx-limited_3d-cancer-cancermodel-activity-6610131437775663104-ySpc

Other activities:

2020 Scottish 10K Run, fundraising for Cancer Research UK (Edinburgh, UK):
https://fundraise.cancerresearchuk.org/page/africagalv