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Screening and longitudinal analysis of different circulatory glycoproteins in the monitoring of lung cancer

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MOLECULAR BIOTECHNOLOGY AND DIAGNOSTICS

Introduction

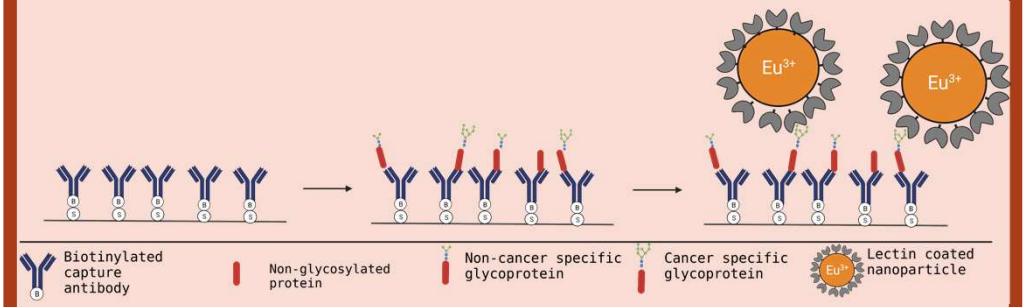
- Lung cancer is the 2nd most common cancer, and it has the highest mortality rate of all cancers in both genders worldwide.
- Patients often develop resistance to treatment; thus their status needs to be monitored throughout.
- Glycosylation changes are considered a hallmark of cancer, recognizing these changes could lead to a specific and sensitive biomarker development.
- Lectins, carbohydrate-binding proteins with high specificity but these molecules have poor affinity towards there sugar moieties.
- Coating lectins on fluorescent europium-nanoparticles increases avidity.

Aim

To develop novel blood-based biomarkers for assessment of treatment response in lung cancer by detecting glycosylation forms that correlate with cancer progression.

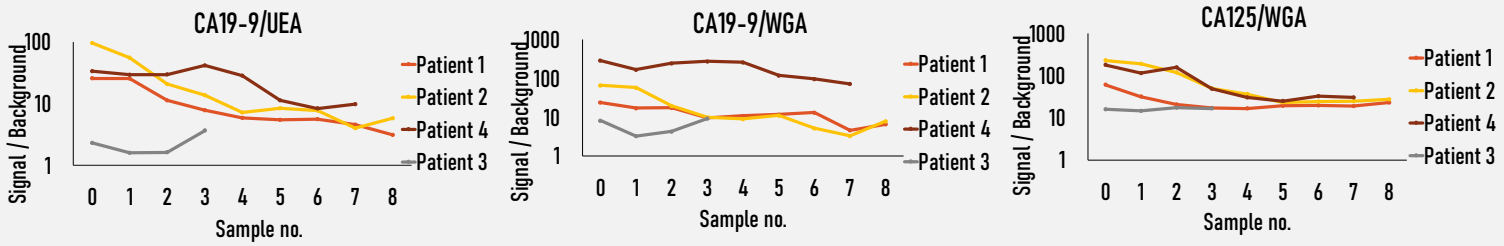
Materials and methods

- 16 different capture/tracer combinations were assayed in EDTA plasma samples of 7 patients:
  - Capture antibodies that bind 4 different glycoproteins: CA125, CA19-9, CEA and CA15-3.
  - Different lectins coated on europium-nanoparticles (UEA, MBL, WGA and WFL) which bind to different glycan moieties and produce fluorescence.
- After washing of unbound nanoparticles, time resolved fluorescence is measured

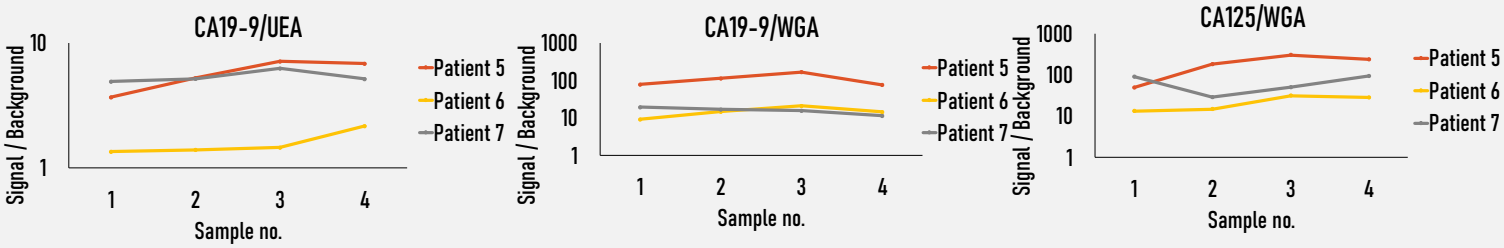


Results

Disease regression



Disease progression



Out of the tested combinations the ones that follow the clinical history trend in most patients (glycovariant decrease in disease regression and increase in disease progression) are CA19-9/UEA, CA19-WGA and CA125-WGA

Conclusions

The preliminary results obtained during this research show promise for two CA19-9 and one CA125 GV as potential biomarkers that reflect patients' response to treatment. These GVs could alert clinicians much faster about drug responses in individuals, improving their treatment.