# Associations of plasma concentrations of MGO-ALB$_{243-249}$, a signature peptide of glycated albumin, with the risk of cardiovascular death in type 2 diabetes

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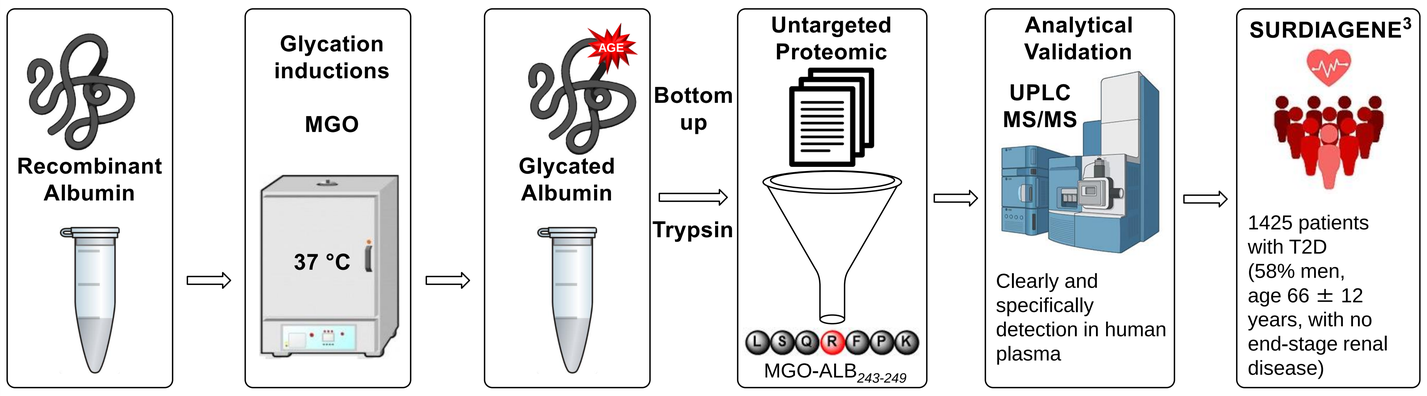
## ❶ Introduction

- Chronic hyperglycemia underlying type 2 diabetes (T2D) is a risk factor for cardiovascular (CV) diseases.[1]
- Glycation is an irreversible and non-enzymatic post-translational modification increased in T2D.
- High levels of plasma methylglyoxal (MGO), a potent glycation agent, are associated with CV death in T2D.[2]

## ❷ Aim

**To identify signature peptides of MGO-glycated albumin to assess their association with CV death in patients with T2D.**

## ❸ Methods




- The association between signature peptides of MGO-glycated albumin and the risk of CV death was evaluated by Cox model and expressed as Hazard Ratio (HR) for an increment of one standard deviation of the concentration.

## ❹ Results

**Figure 1.** Identification of a signature peptide of MGO-glycated albumin

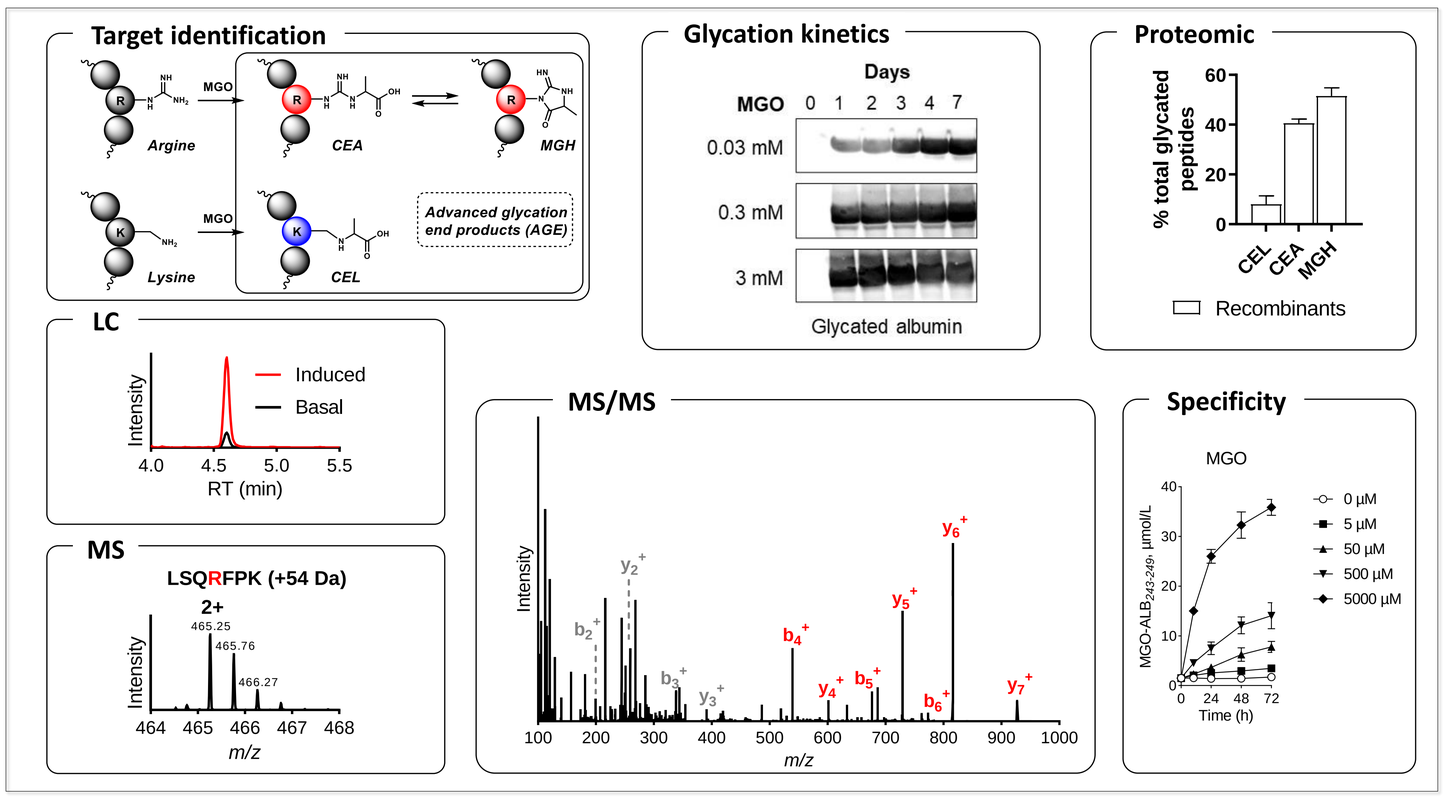



**Figure 2.** Validation of MGO-ALB$_{243-249}$ peptide biomarker

| Parameters | Pool 1 | Pool 2 | Pool 3 |
|---|---|---|---|
| Concentrations | Low | Middle | High |
| Intra-assay precision (CV%) | 6.5 | 5.5 | 5.1 |
| Inter-assay precision (CV%) | 7.2 | 6.5 | 5.3 |
| Linearity | $R^2$ > 0.998 (10 → 100 000 nmol/L) | | |
| Stability | Stable after 3 freeze/thaw cycles | | |

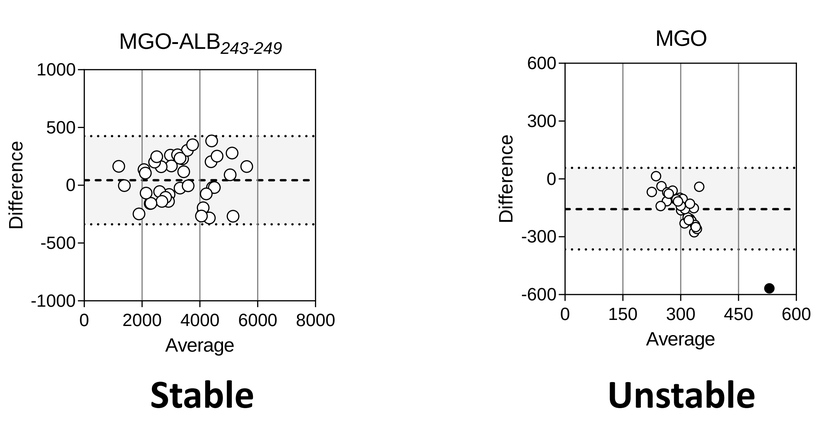
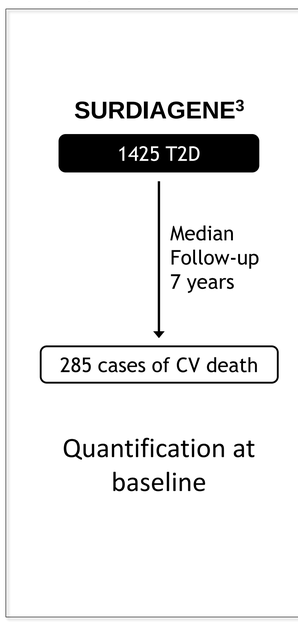
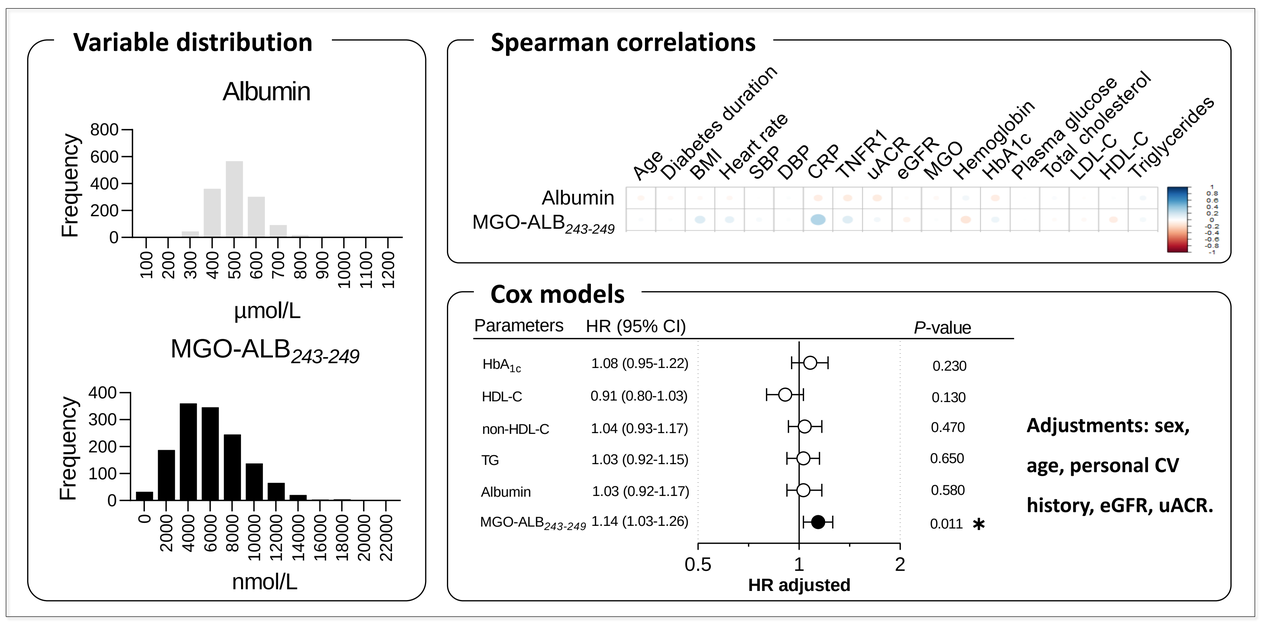



**Figure 3.** Clinical characteristics of patients of the SURDIAGENE[3] study




| Characteristics | Values |
|---|---|
| **Clinical** | |
| Sex (female) | 599/1425 (42%) |
| Age (y) | 65.7 ± 11.7 |
| Diabetes duration (y) | 13 [6; 20] |
| BMI (kg/m²) | 31.3 ± 6.3 |
| History AVC | 184/1425 (12.9%) |
| History IDM | 287/1425 (20.1%) |
| Smoking | 152/1407 (10.8%) |
| HR (bpm) | 71 ± 14 |
| SBP (mmHg) | 132 ± 18 |
| DBP (mmHg) | 72 ± 11 |
| **Inflammation** | |
| TNFR1 (ng/mL) | 1.84 [1.55; 2.32] |
| CRP (mg/L) | 3.1 [1.4; 7.0] |
| **Glycaemia** | |
| uACR (mg/mmol) | 3 [1; 13] |
| eGFR (CKD-EPI, mL/min/1.73 m²) | 74.4 ± 23.2 |
| $HbA_{1c}$ (%) | 7.8 ± 1.5 |
| Glycaemia (g/L) | 1.56 ± 0.61 |
| MGO (µmol/L) | 0.196 ± 0.087 |
| **Lipemia** | |
| Total cholesterol (mmol/L) | 4.78 ± 1.15 |
| LDL-cholesterol (mmol/L) | 2.74 ± 0.96 |
| HDL-cholesterol (mmol/L) | 1.21 ± 0.41 |
| Non-HDL cholesterol (mmol/L) | 3.57 ± 1.16 |
| Triglycerides (mmol/L) | 1.55 [1.11; 2.27] |
| ApoA-I (µmol/L) | 45.89 ± 10.58 |
| ApoB100 (µmol/L) | 1.59 ± 0.57 |

**Figure 4.** Associations of MGO-ALB$_{243-249}$ with CV death in T2D




## ❺ Conclusion

We have identified a novel signature peptide of MGO-mediated glycation of plasma albumin that is associated with the risk of CV death in patients with T2D. Its potential interest as a novel CV risk biomarker in T2D has to be confirmed in other cohorts.

## References

1. Rawshani *et al.*, *N Engl J Med*, 2018
2. Hanssen *et al.*, *Diabetes Care*, 2018
3. Hadjadj *et al.*, *Diabetes Care*, 2008