COMP-M A POTENTIAL SEROLOGICAL BIOMARKER OF OSTEOARTHRITIS

#164

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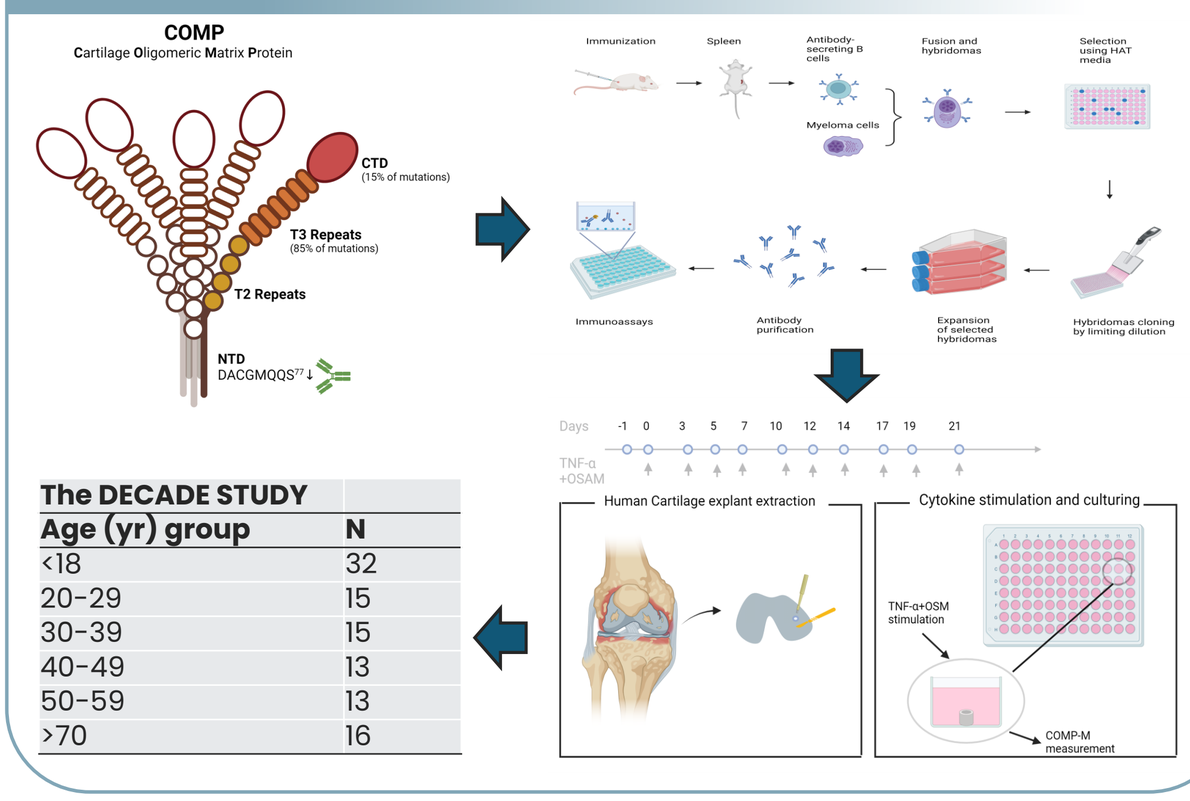
BACKGROUND

Cartilage oligomeric matrix protein (COMP) is an extracellular matrix (ECM) glycoprotein, consisting of five identical chains. It plays a crucial role in maintaining ECM integrity, facilitating collagen fibrils formation, and regulating cell phenotypes and functions. It is primarily found in human skeleton system, also present in adipose tissue, heart etc.

Osteoarthritis (OA) involves increased activity of matrix-degrading enzymes, leading to the fragmentation of ECM. In this study, we developed a high-sensitive chemiluminescence immunoassay for quantifying a neoepitope of COMP (DACGMQQS^{77}↓) and explored its application as a biomarker of OA.

METHODS



The DECADE STUDY	
Age (yr) group	**N**
<18	32
20-29	15
30-39	15
40-49	13
50-59	13
>70	16

RESULTS

Calibration Curve

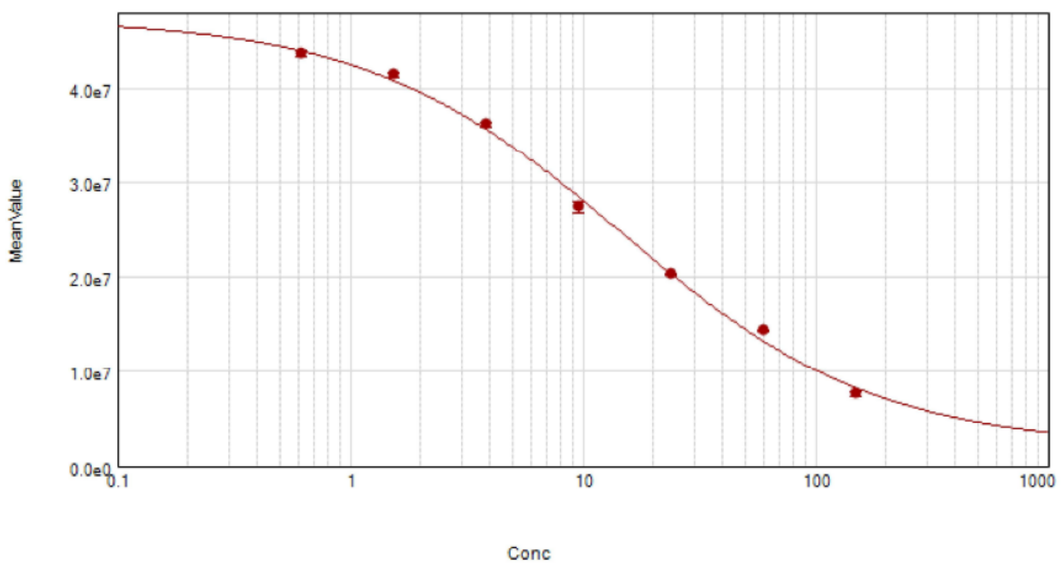


Fig. 1 A four-parameter logistic (four-PL) model to fit the calibration curve

Table 1. The specifications of COMP-M assay

Species possibilities	Human serum
Standard A	150 ng/mL
Control 1 (±20%)	4.6 (3.68 – 5.52) ng/mL
Control 2 (±20%)	57.2 (45.76 – 68.64) ng/mL
Intended matrix (MRD)	Human serum (1+0)
Intra-assay CV%	2.3% – 14%
Inter-assay CV%	3.1% – 16%
LLOB	1.38 ng/mL
Measurement range: LLOQ-ULOQ	1.66 - 150 ng/mL
Mean Slope (±20%)	0.78 (0.62 – 0.94)
Curve fit model	4-parameter logistic(PL) curve fit
Accepted maximum freeze-thaw (sample)	5 freeze-thaw cycles (serum)
Accepted maximum stress (sample)	48 hours at 4°C (serum) 24 hours at 20°C (serum) 4 hours at 37°C (serum)

Note: MRD: Minimal Required Dilution; CV%: coefficient variation percentage; LLOQ: Lower limit of quantification; ULOQ: Upper limit of quantification;

In vitro human cartilage cleavage

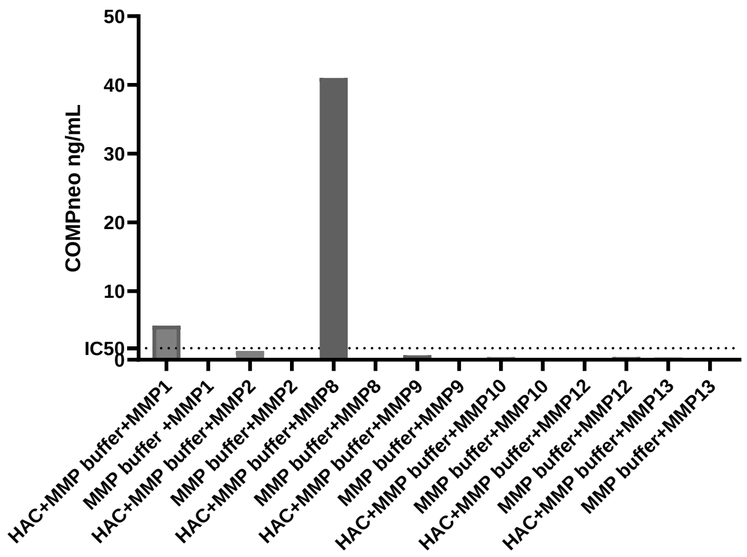


Fig. 2 In vitro, MMP-8 is the primary enzyme responsible for generating the neoepitope

COMP-M profile in an *Ex vivo* model of OA

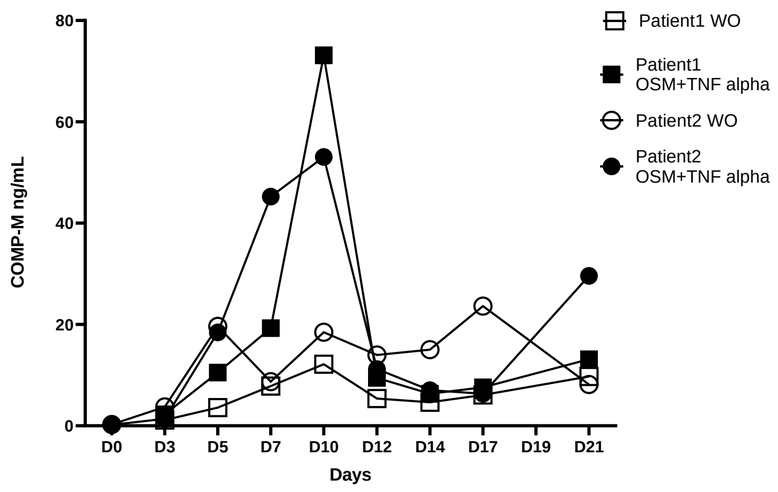


Fig. 3 COMP-M was released and reached its peak in the medium of HEX exposed to cytokine by day 10

COMP-M levels in the DECADE study

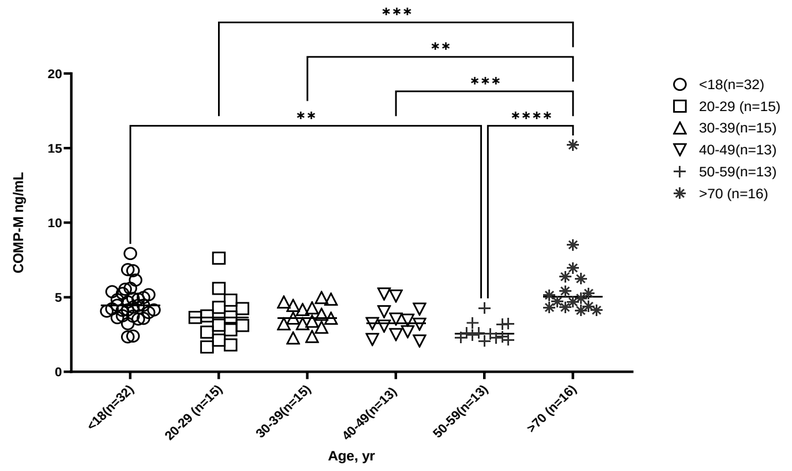


Fig. 4 COM-P levels was elevated in the oldest group who are at high risk of developing OA. * p<0.05 ; ** p<0.01; *** p<0.001; **** p<0.0001

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CONCLUSION

The data generated interest in the use of COMP-M as a tissue degradation biomarker of osteoarthritis.

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