

Anti-CarP

Antibodies to Carbamylated Proteins Provide Insight into Rheumatoid Arthritis

By Labmedica International staff writers

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Detection of antibodies to carbamylated proteins (anti-CarP) is an important advance in the diagnosis of Rheumatoid Arthritis (RA).

A study published in 2012 by a team at Leiden University Medical Center (LUMC; Leiden, The Netherlands) in *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* showed that Immunoglobulin G (IgG) and IgA antibodies recognizing carbamylated antigens were present in about 50% of RA patients. Anti-CarP antibodies recognize homocitrulline and are therefore distinct from anticitrullinated protein antibodies (ACPA), including anti-cyclic citrullinated peptide (anti-CCP), a biomarker commonly used to diagnose RA. Anti-CarP IgG and IgA were detected in 16% and 30% of ACPA negative RA patients respectively. Additionally, anti-CarP antibodies were shown to be predictive of a more severe course of disease as measured by radiological progression in ACPA negative RA patients.

Important development in diagnosis of Rheumatoid Arthritis

**Leiden University Medical Center licenses novel diagnostic for Rheumatoid Arthritis
to INOVA Diagnostics**

January 28, 2013

Leiden, The Netherlands and San Diego, CA, US -- Leiden University Medical Center (LUMC) and INOVA Diagnostics are pleased to announce the completion of an exclusive, worldwide license agreement for technology developed at LUMC to detect antibodies to carbamylated proteins (anti-CarP). This technology represents an important advance in the diagnosis of Rheumatoid Arthritis (RA).

“The detection of autoantibodies in sera of RA patients has provided important insight into the processes that initiate and drive RA. Since anti-CarP antibodies can also be detected in a subgroup of patients for whom so far no serological markers were available we believe this may provide new insight

New biomarkers in rheumatoid arthritis

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ANTI-CARBAMYLATED PROTEIN (ANTI-CARP) ANTIBODIES

ACPA recognise proteins only after the enzymatic conversion of the amino acid arginine by PAD enzymes to become the amino acid citrulline. Next to citrullination, also other post-translational modifications are known to occur. Therefore, it is likely that proteins that have undergone a different type of post-translational modification are also recognised by autoantibodies. One of these other post-translational processes is the process of carbamylation. In this chemical reaction, mediated by cyanate, the



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Review

Closing the serological gap: promising novel biomarkers for the early diagnosis of rheumatoid arthritis

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EDITORIAL

Gauging rheumatoid arthritis

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Anticitrulline Antibodies Can Be Caused by Homocitrulline-Containing Proteins in Rabbits

Sanna Turunen, Marja-Kaisa Koivula, Leila Risteli, and Juha Risteli

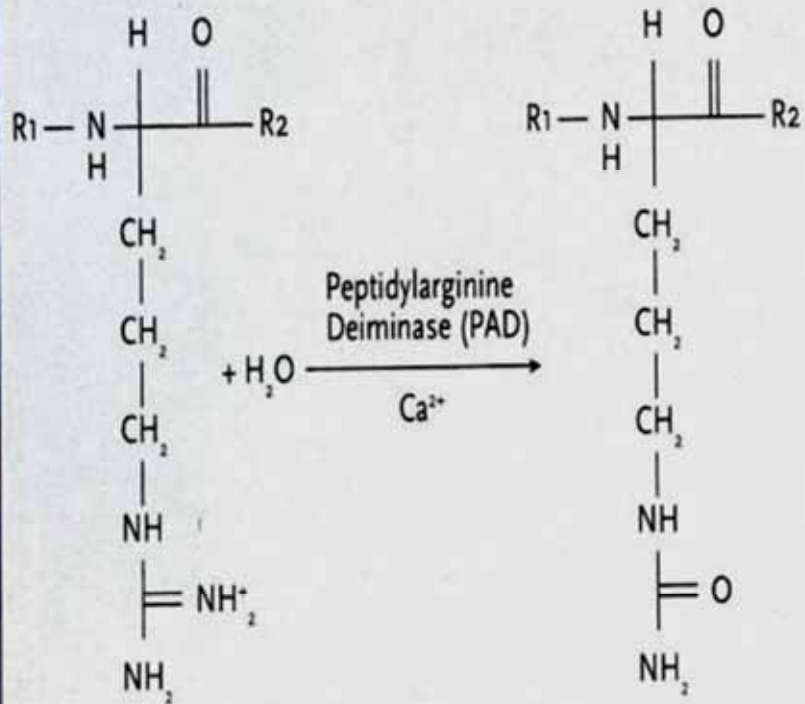
Autoantibodies recognizing carbamylated proteins are present in sera of patients with rheumatoid arthritis and predict joint damage

Jing Shi^{a,1}, Rachel Knevel^a, Parawee Suwannalai^a, Michael P. van der Linden^a, George M. C. Janssen^b, Peter A. van Veelen^b, Nivine E. W. Levarht^a, Annette H. M. van der Helm-van Mil^a, Anthony Cerami^{c,1}, Tom W. J. Huizinga^a, Rene E. M. Toes^a, and Leendert A. Trouw^{a,1}

Shi J et al. PNAS 2011;108:17372-17377

A

Citrullination

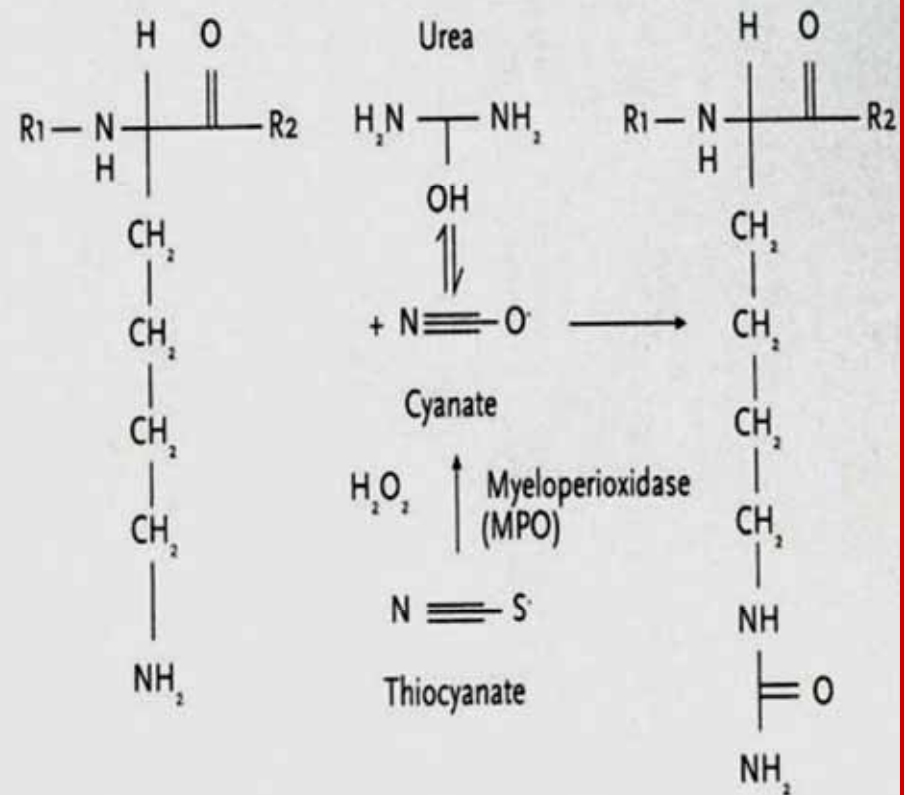


Arginine

Citrulline

B

Carbamylation



Lysine

Homocitrulline

ANTI-CCP2 IgG**ANTI-CarP IgG**

+

+

37 %

-

+

14 %

+

-

8 %

ANTI-CCP2 IgA**ANTI-CarP IgA**

+

+

29 %

-

+

22 %

+

-

15 %