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The Science of High-Sensitivity Troponins: From research to Clinical Practice

Scientific excellence for IVD

Welcome and Introductions – Jessica Xie

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Agenda

- Welcome and Introductions – Jessica Xie
- An in-depth dialogue led by the keynote speaker and featured speaker
  - Over Thirty Years of Cardiac Troponin – Where Are We Now?
    – Professor Allan Jaffe, MD
  - High-Sensitive troponins for differential diagnostics of acute cardiac events
    – Dr. Ivan Katrukha
- Q&A

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Who We Are

- 30+ years of dedication to providing top-tier immunological reagents for the IVD industry and research community
- An extensive product portfolio, featuring selected products as standard reference materials
- Active participation in IFCC and ADLM standardization committee work
- Operations compliant with ISO 9001:2015
- Headquarters in Finland and operations in 3 continents with 150+ employees globally
- Products developed based on solid science with 55+ scientific publications
- Organizing educational webinars and close collaborations with KOLs
- Market presence in 55+ countries

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Comprehensive Product Portfolio

Product categories

Monoclonal antibodies
Polyclonal antibodies
Antigens
Sera and Plasma


Cardiac Markers


Infectious Diseases


Inflammation


Neuroscience


Thyroid Diseases


Blood Coagulation and Anemia


Tumor Markers


Bone Metabolism


Kidney Diseases


Metabolic Syndrome


Fertility and Pregnancy


Veterinary


Microbial and Plant Toxins


Hormone Markers


Immunology and Serology

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Cardiac Markers Product Line

Heart failure	Acute myocardial infarction (AMI)	Other markers of cardiovascular diseases
ProBNP, BNP and NT-proBNP ST2	Troponin I *New gen!* Troponin C Troponin T FABP Myoglobin	Lp-PLA2 PAPP-A IGFBP-4 MPO CRP sCD40L GPBB

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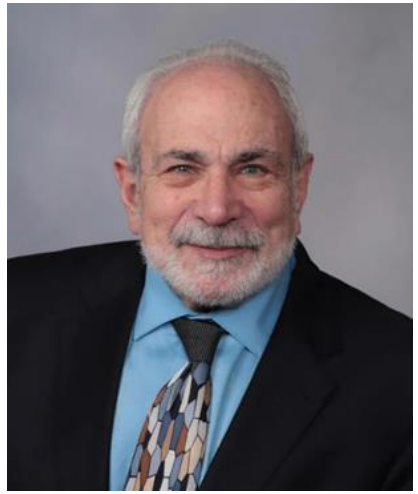
Professor Allan Jaffe, MD



Wayne and Kathryn Preisel Professor of Cardiovascular Disease Research
Professor of Medicine and Professor of Laboratory Medicine and Pathology
Mayo Clinic College of Medicine and Science
Rochester, Minnesota
USA

Prof Jaffe is a Professor of Medicine at the Mayo Clinic College of Medicine and Science. He completed his residency and fellowship training at the Washington University School of Medicine in St. Louis, where he rose to Professor of Medicine. In 1995 he became Chief of Cardiology and Associate Chair of Medicine for Academic Affairs at the State University of New York at Syracuse. Thereafter, he was recruited to the Mayo Clinic to work clinically in the area of acute ischemic heart disease and to continue his work on cardiovascular biomarkers in laboratory medicine. He has been awarded the Distinguished Teacher award by the American College of Cardiology, and a career achievement award for his targeted contributions to the laboratory community by the American Association for Clinical Chemistry and the 2024 IFCC award for contributions to cardiovascular diagnostics.

His research interests focus on the use of biomarkers to characterize the pathobiology of acute cardiovascular disease. In collaboration with investigators at Washington University, he developed and validated the first cardiac troponin I assay. He is on many prestigious editorial boards in Cardiology and Laboratory Medicine and has chaired the biochemistry group for the Universal definition of myocardial infarction effort since 1999. He authored more than 800 papers, five books, and multiple book chapters.

Dr. Ivan Katrukha

PhD, Senior researcher in Research & Development, Hytest

Dr. Katrukha has worked in Hytest for 15 years and is specialized in immunodetection of cardiac troponins.

In his speech Dr. Katrukha will discuss the main biochemical features of cardiac troponins that have an impact on the high-sensitive measurement of these biomarkers in the samples of patients. He will also talk about new approaches in the immunodetection of troponins that may lead to more specific detection of myocardial infarction.

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The Keynote Speaker:
Professor Allan Jaffe, MD

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Over Thirty Years of Cardiac Troponin – Where Are We now?

Allan S. Jaffe, MD.*

Consultant - Cardiology & Laboratory Medicine and Pathology

Professor of Medicine and Laboratory Medicine & Pathology

Wayne and Kathryn Preisel Professor of Cardiovascular Disease Research

Mayo Clinic and Medical School

Rochester, Minnesota

Hytest Webinar

*Dr. Jaffe is or has been a consultant to most of the major diagnostic companies, as well as Moderna and SpinChip. He has stock options in RCE Technolgies.

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Over Thirty Years of Cardiac Troponin – Where Are We now?

Please note: Dr. Jaffe's slide deck is confidential and is not included in this presentation. However, the slides can be viewed in the recorded video material.

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The Featured Speaker:
Dr. Ivan Katrukha

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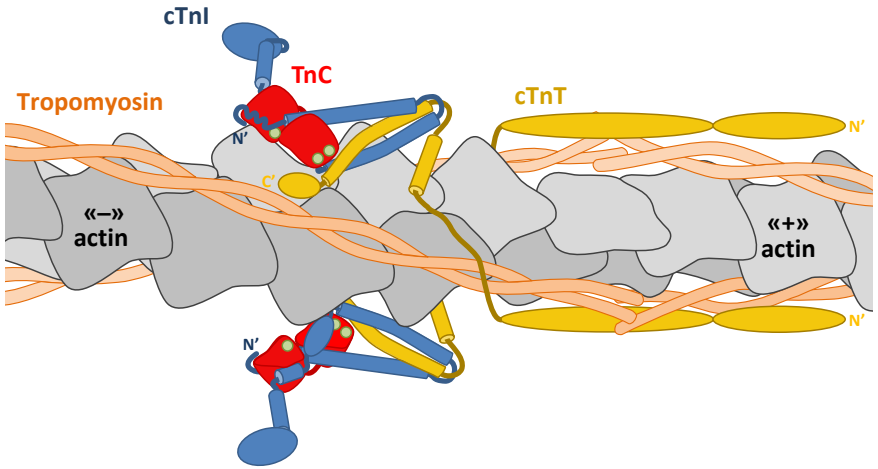
High-sensitive troponins for differential diagnostics of acute cardiac events

Dr. Ivan Katrukha

High-sensitive troponins

- Troponins form ternary complex
- Immunodetection of cardiac isoforms of troponins I or T in blood – a «golden standard» for diagnosis of MI
- High sensitivity and specificity



Katrukha IA, Biochemistry (Moscow), 2013

	LoD, ng/L	LoQ (10% CV), ng/L	99th Percentile (ng/L)	Percent Normals Measured ≥ LoD
ARCHITECT Abbott US	1.7	4.6	Overall: 28 F: 17 M: 35	Overall: 85% F: 78% M: 92%
Access Beckman Coulter US, LiHep plasma	1.0-2.0	4.1	Overall: 17.5 F: 11.6 M: 19.8	> 50%
Pylon ET Healthcare	1.2 – 1.4	10	Overall: 27 F: 21 M: 27	Overall: 91% F: 89% M: 94%
Mindray CL- series	0.5-0.7	2.0-2.3	Overall: 24.2 F: 15.3 M: 31.3	Overall: 93% F: 87% M: 99%
VITROS Ortho	0.39-0.86	1.99	Overall: 11 F: 9 M: 13	>50%
ATELLICA Siemens	1.2	6.7	Overall: 45.4 F: 38.6 M: 53.5	Overall: 75% F: 62% M: 89%

High-Sensitivity Cardiac Troponin I and T Assay Analytical Characteristics Designated by Manufacturer IFCC Committee on Clinical Applications of Cardiac Bio-Markers v062024

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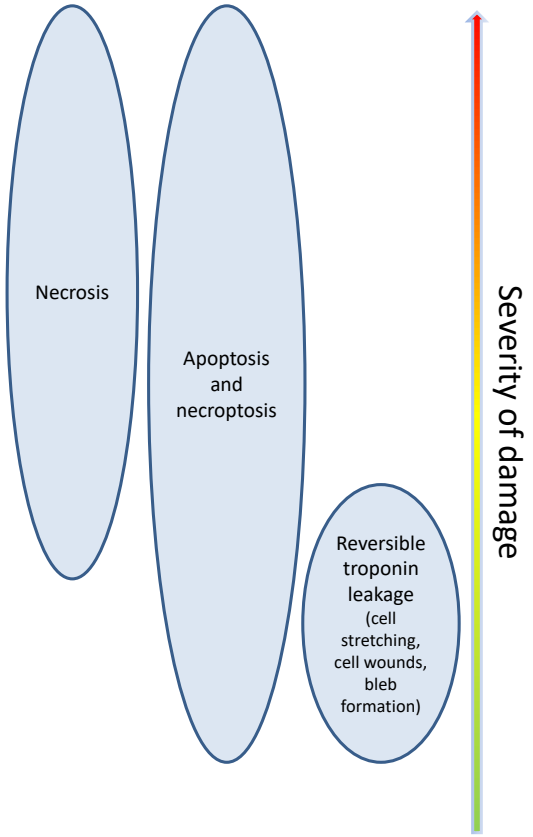
Troponin elevation – not only AMI

Clinical manifestation	Possible causes of elevation
AMI	Prolonged ischemia
Acute HF	
Pulmonary embolism	
Chest trauma or surgery	Mechanical cell destruction, local inflammation
Stroke or brain trauma	Catecholamine-derived myocyte overload or ischemia due to type II MI
Cardiotoxicity	Cardiotoxic agents (drugs, CO, poisons)
Myocarditis, endocarditis	Inflammation
Sepsis	
Atrial fibrillation	Brief ischemia Muscle overload
Chronic HF	
Stable CAD	
Physical exercises	
Renal failure	Impaired clearance
Skeletal muscle disorders	Expression of cTnT in regenerating skeletal muscles

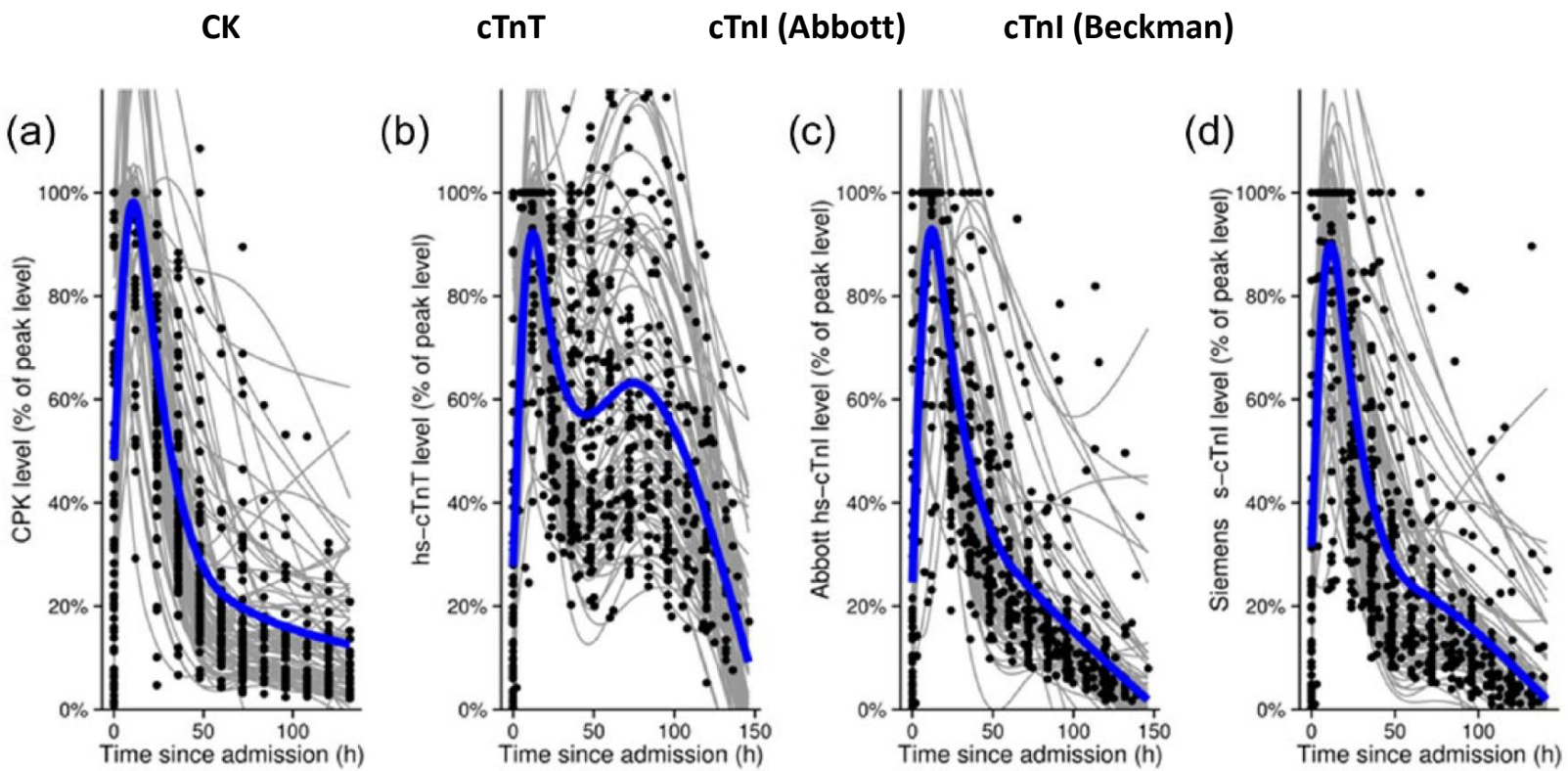
Possible mechanism



Katrukha IA, Katrukha AG, ClinChem, 2021

Hytest

Troponin release dynamics are different



Laugaudin G. *et al.* Acute Cardiovascular Care, 2016

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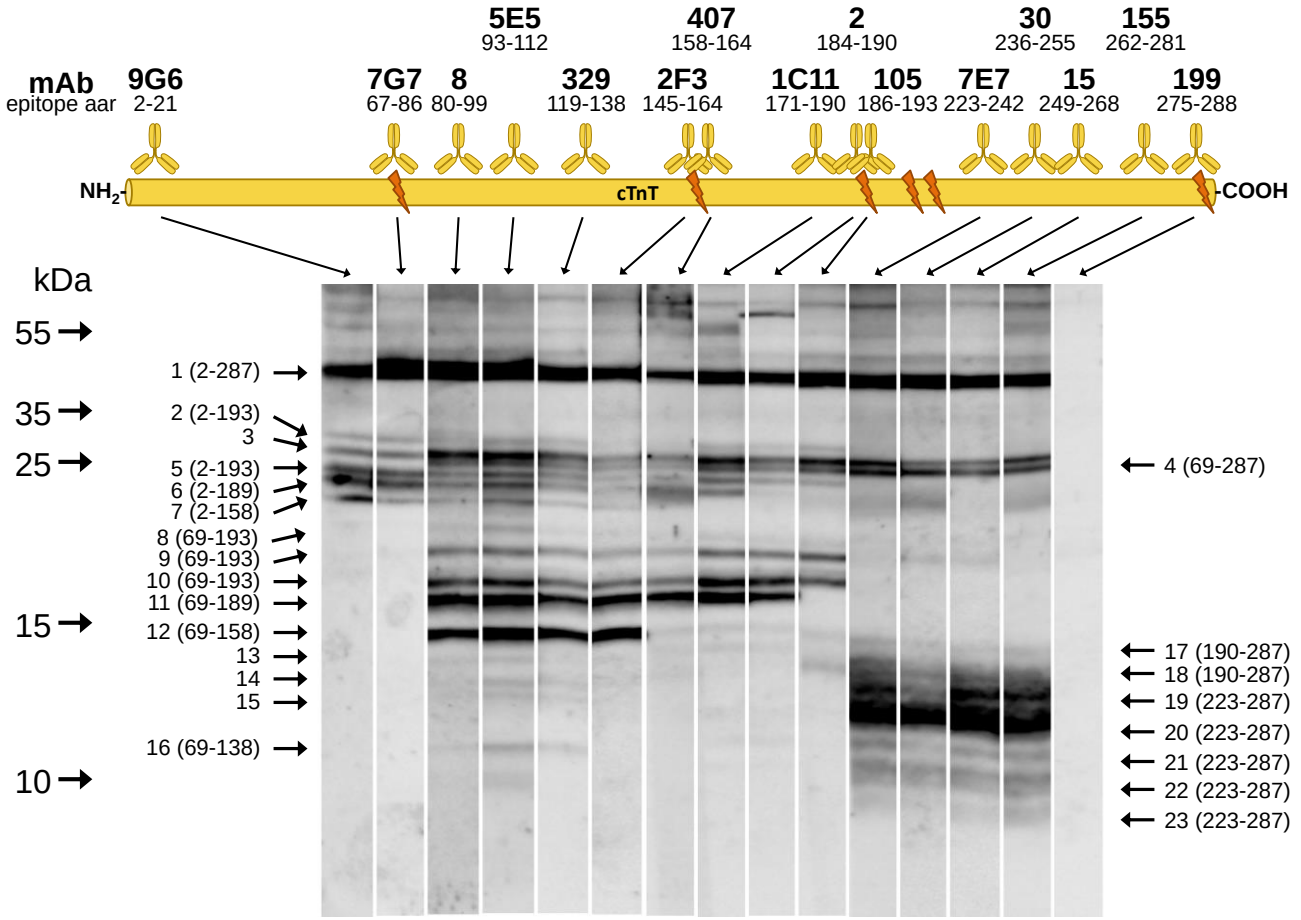
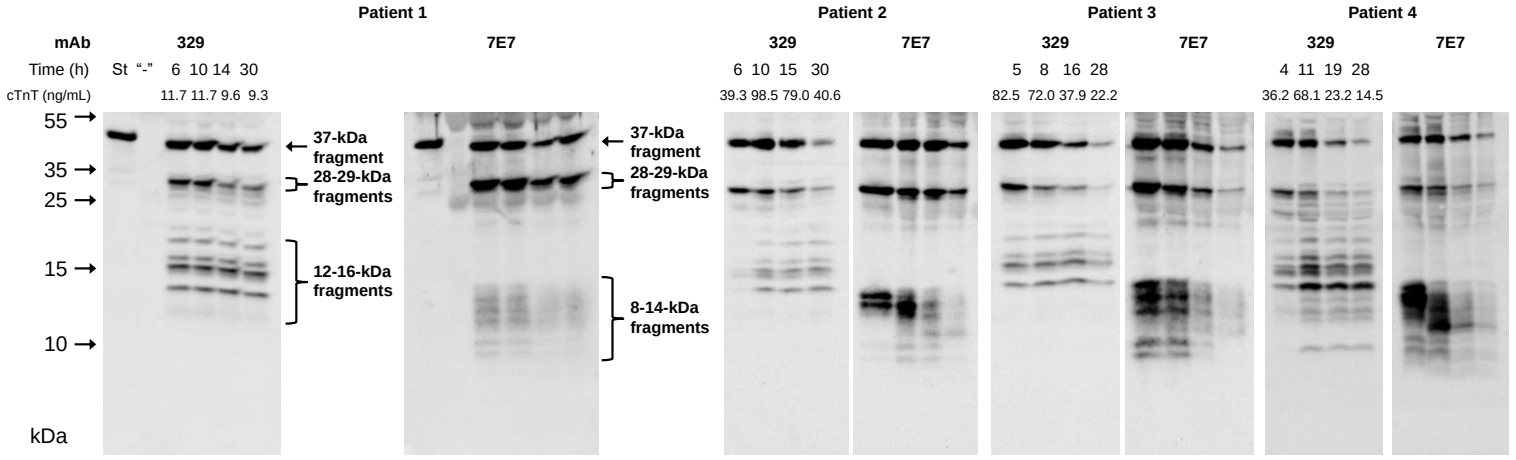
cTnT proteolysis

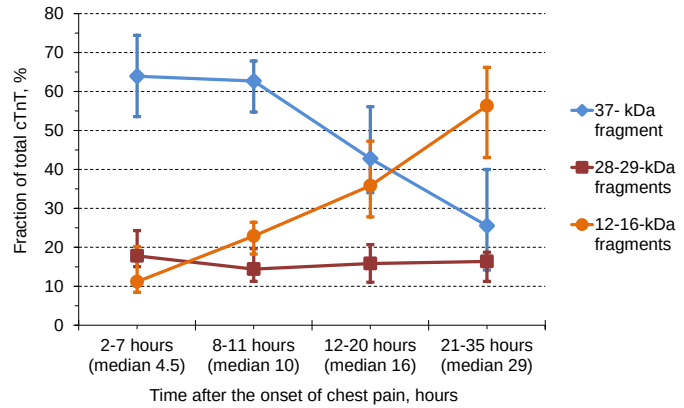


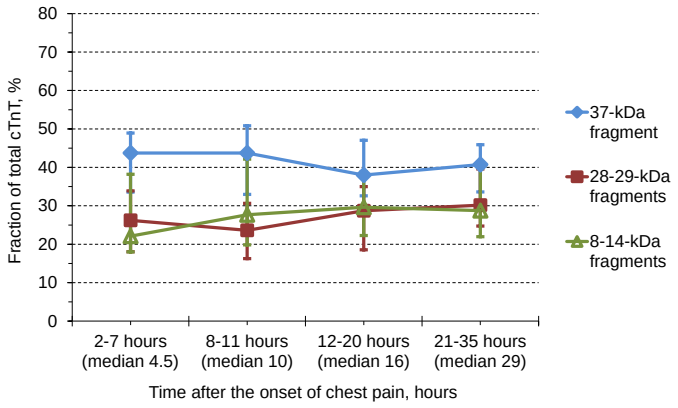
Katrukha IA *et al.* ClinChimActa, 2023

Hytest

Different cTnT forms at different stages of AMI



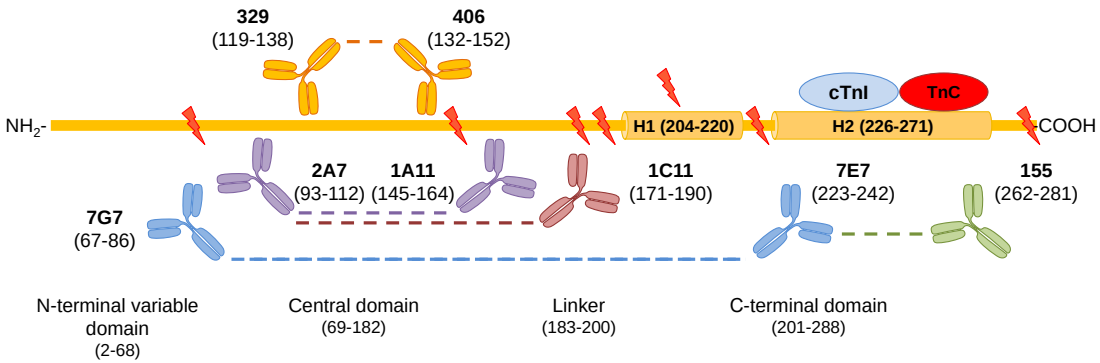


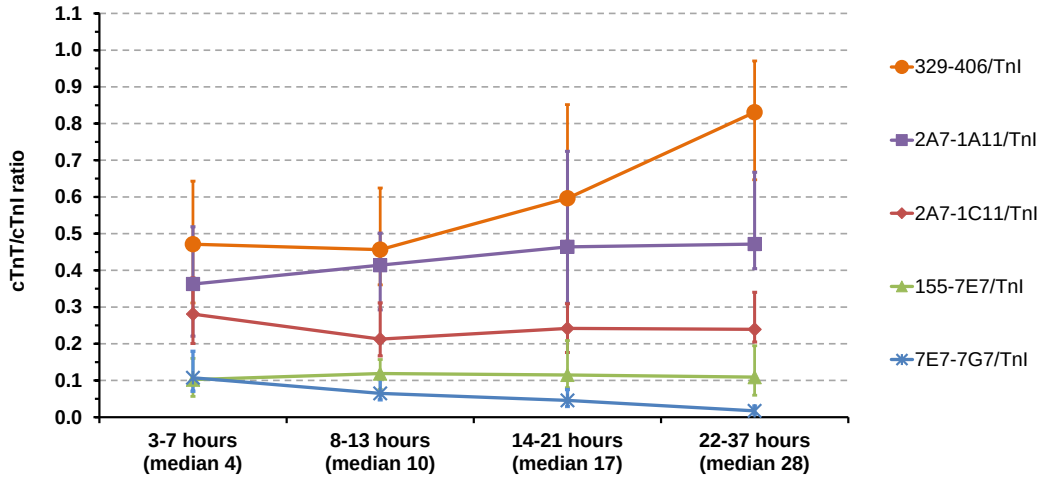


Katrukha IA *et al.* ClinChimActa, 2023

Hytest

Different cTnT forms at different stages of AMI





Katrukha IA *et al.* ClinChimActa, 2023

Hytest

Different cTnT forms in different conditions

Clinical Chemistry 63:3
683–690 (2017)

Proteomics and Protein Markers

Cardiac Troponin T: Smaller Molecules in Patients with End-Stage Renal Disease than after Onset of Acute Myocardial Infarction

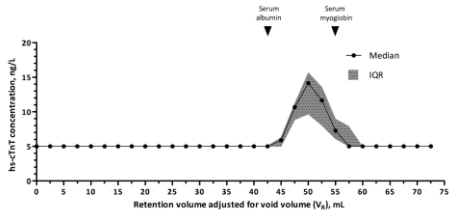
Alma M.A. Mingels,[1,2*] Eline P.M. Cardinaels,[1,2] Natascha J.H. Broers,[3,4] Anneke van Sleeuwen,[1,2] Alexander S. Streng,[1,2] Marja P. van Dieijen-Visser,[1,2] Jeroen P. Kooman,[3,4] and Otto Bekers[1,2]

RESEARCH LETTER

Novel Troponin Fragmentation Assay to Discriminate Between Troponin Elevations in Acute Myocardial Infarction and End-Stage Renal Disease

K.E. Juhani Airaksinen, MD, PhD*; Rami Aalto, MSc*; Tapio Hellman, MD, PhD; Tuija Vasankari, MSc; Akseli Lahtinen, BSc; Saara Wittfooth, PhD

Cardiac Troponin T: Only Small Molecules in Recreational Runners After Marathon Completion



Vroemen *et al.* JALM, 2019

Clinical Chemistry 00:0
1–9 (2024)

Automation and Analytical Techniques

Highly Sensitive Immunoassay for Long Forms of Cardiac Troponin T Using Upconversion Luminescence

Selma M. Salonen,[a] Tuulia J.K. Tuominen,[a] Kirsti I.S. Raiko,[a] Tuija Vasankari,[b] Rami Aalto,[a] Tapio A. Hellman,[c] Satu E. Lahtinen,[a] Tero Soukka,[a] K.E. Juhani Airaksinen,[b] and Saara T. Wittfooth[a,*]

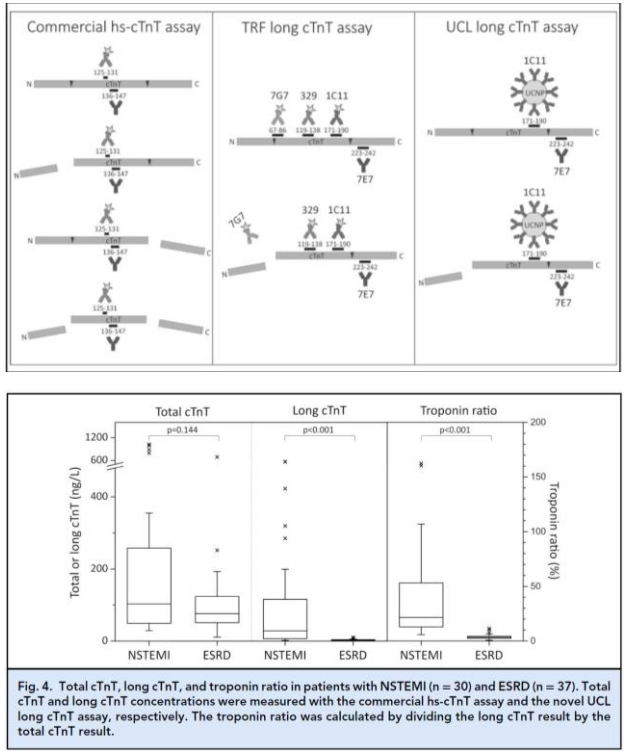


Fig. 4. Total cTnT, long cTnT, and troponin ratio in patients with NSTEMI (n = 30) and ESRD (n = 37). Total cTnT and long cTnT concentrations were measured with the commercial hs-cTnT assay and the novel UCL long cTnT assay, respectively. The troponin ratio was calculated by dividing the long cTnT result by the total cTnT result.

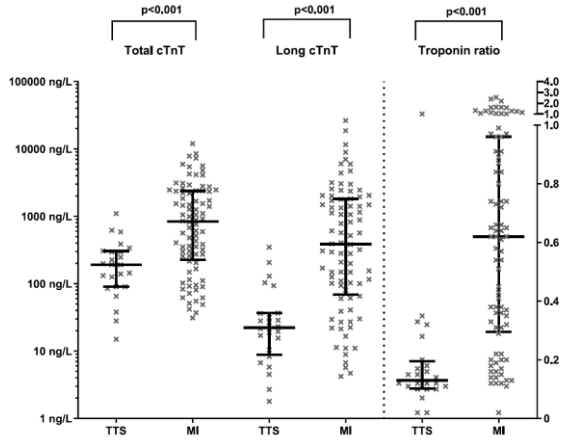
ESC European Society of Cardiology

European Heart Journal: Acute Cardiovascular Care (2024) **00**, 1–7
https://doi.org/10.1093/ehjacc/zuae115

ORIGINAL SCIENTIFIC PAPER
Acute Coronary Syndromes

Novel troponin fragmentation assay to discriminate between Takotsubo syndrome and acute myocardial infarction

Juhani K.E. Airaksinen [1]*, Tuulia Tuominen[2], Tuomas Paana [1], Tapio Hellman [3], Tuija Vasankari[1], Selma Salonen[2], Helea Junes[2], Anna Linko-Parvinen[4,5], Hanna-Mari Pallari[4], Marjatta Strandberg[6], Konsta Teppo [1,2], Samuli Jaakkola[1], and Saara Wittfooth [2]



- Only small free central fragments of cTnT are present in blood in the end-stage renal desease and after marathon
- Low ratio of ”long” cTnT in blood of patients with Takotsubo syndrome

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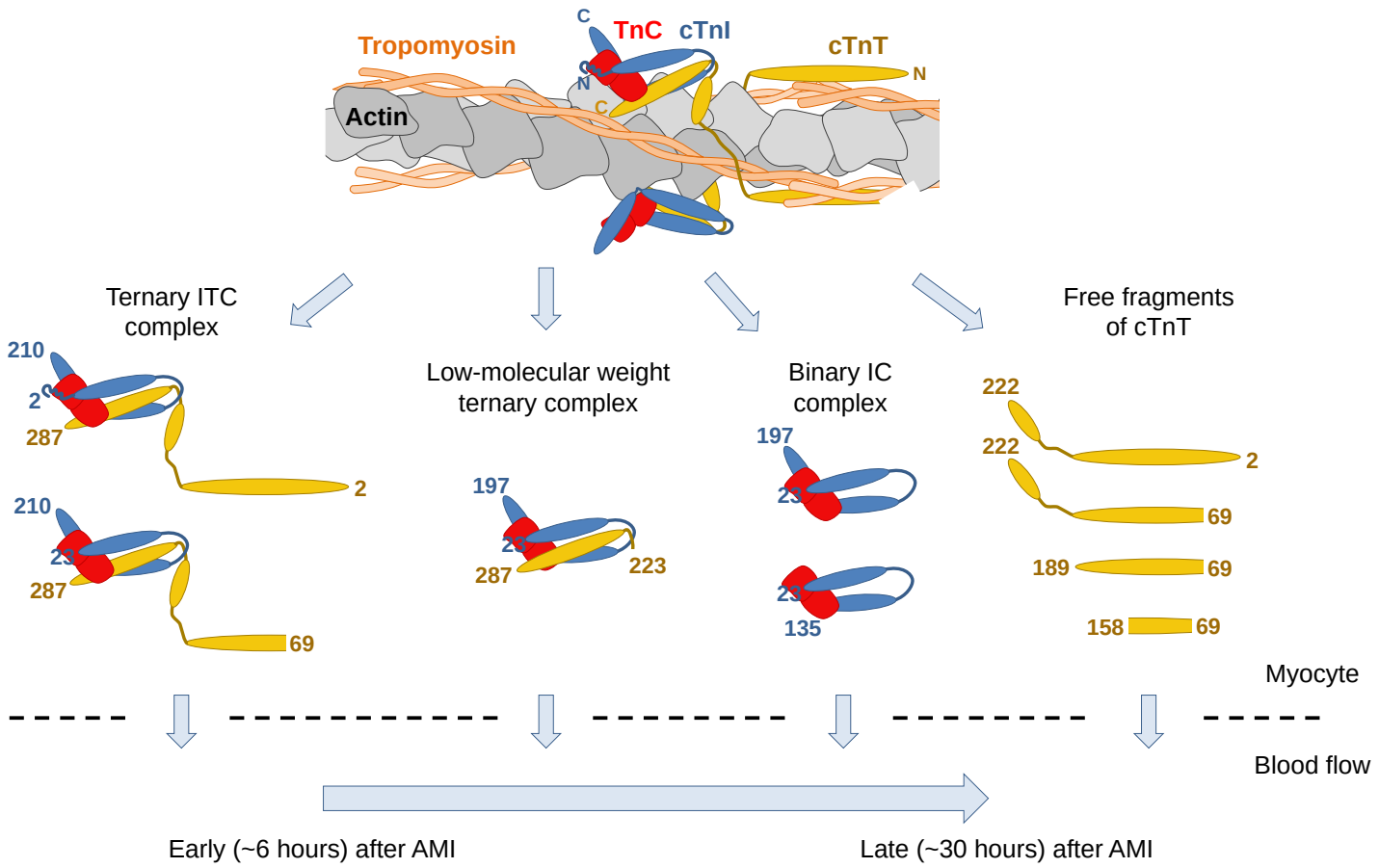
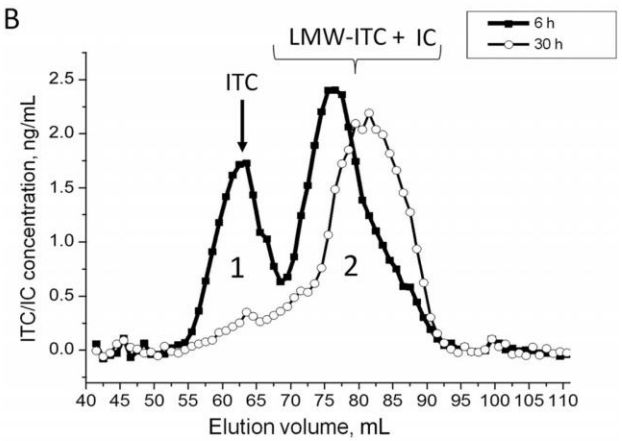
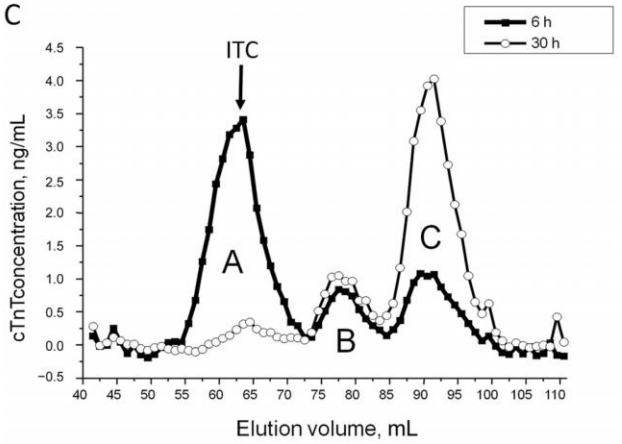
Different troponin complex forms at different stages of AMI







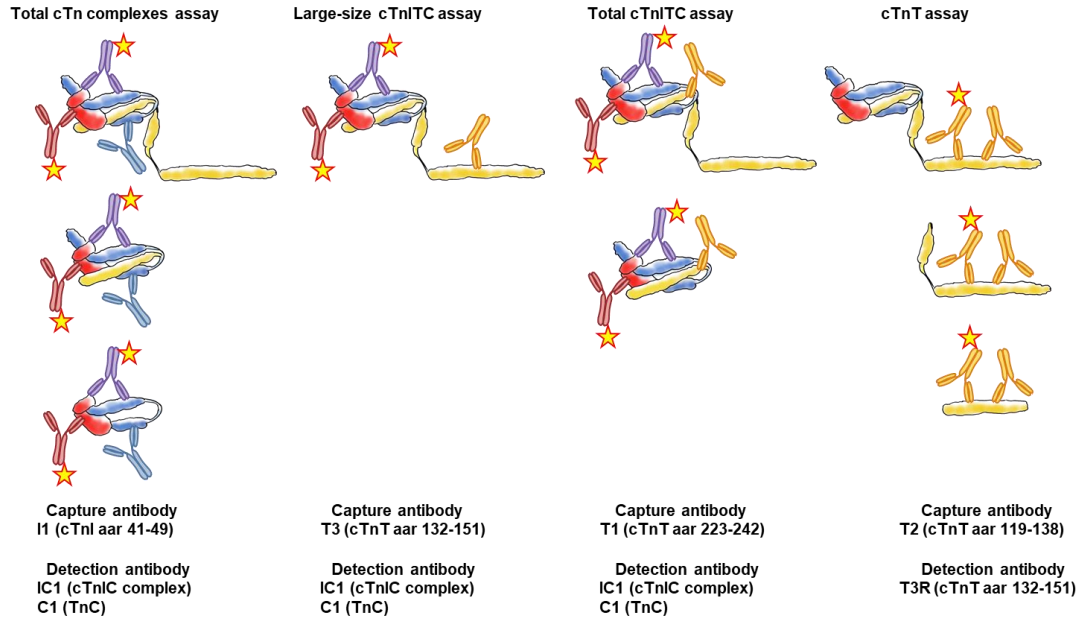
Vylegzhanina AV *et al.* ClinChem, 2018

Hytest

Different troponin complex forms in different conditions

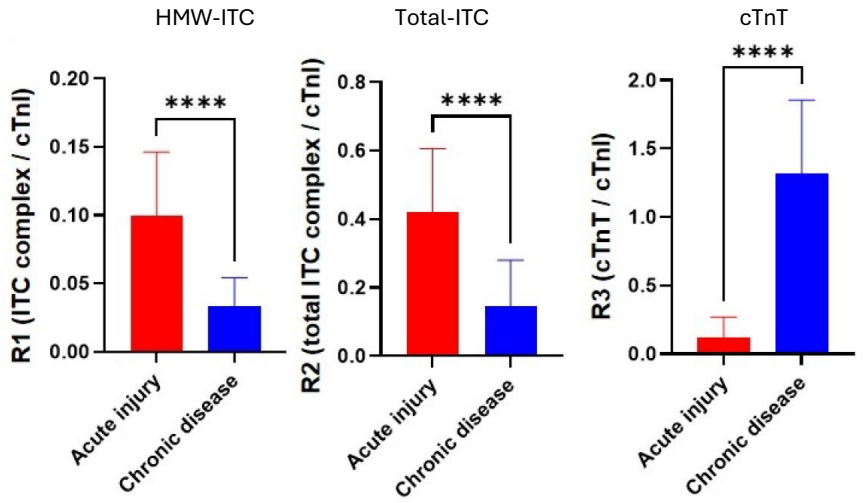
OXFORD UNIVERSITY PRESS | Clinical Chemistry

Design and Analytical Evaluation of Novel Cardiac Troponin Assays Targeting Multiple Forms of the cTnI-cTnT-TnC Complex and Fragmentation Forms



OXFORD UNIVERSITY PRESS | Clinical Chemistry

Characterization of Cardiac Troponin Fragment Composition Reveals Potential for Differentiating Etiologies of Myocardial Injury



- HMW and Total ITC complex ratio is higher in acute than in chronic (CHF, cardiomyopathies) conditions
- cTnT ratio is higher in chronic conditions

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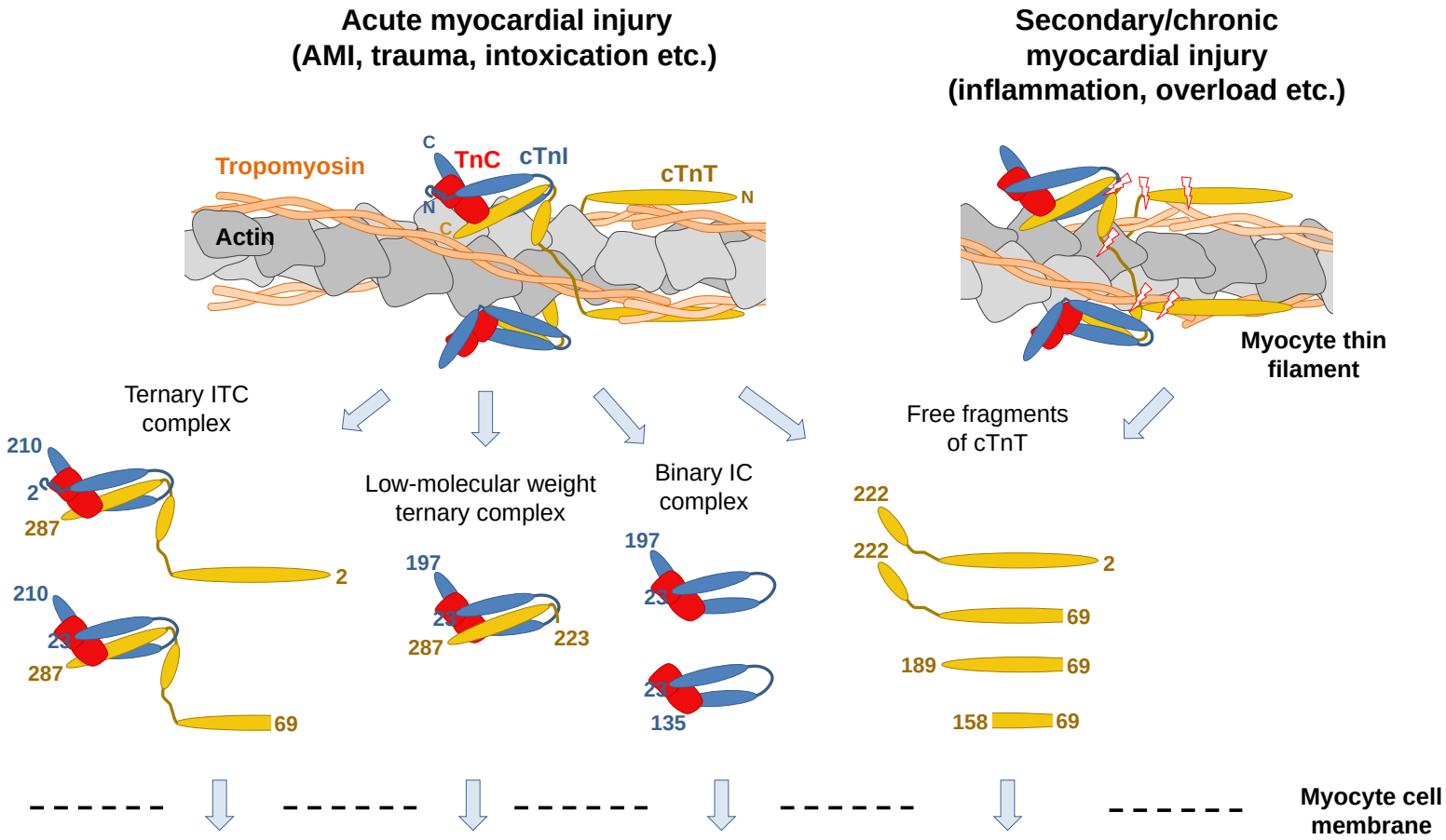
Troponins to discriminate between acute and chronic conditions?



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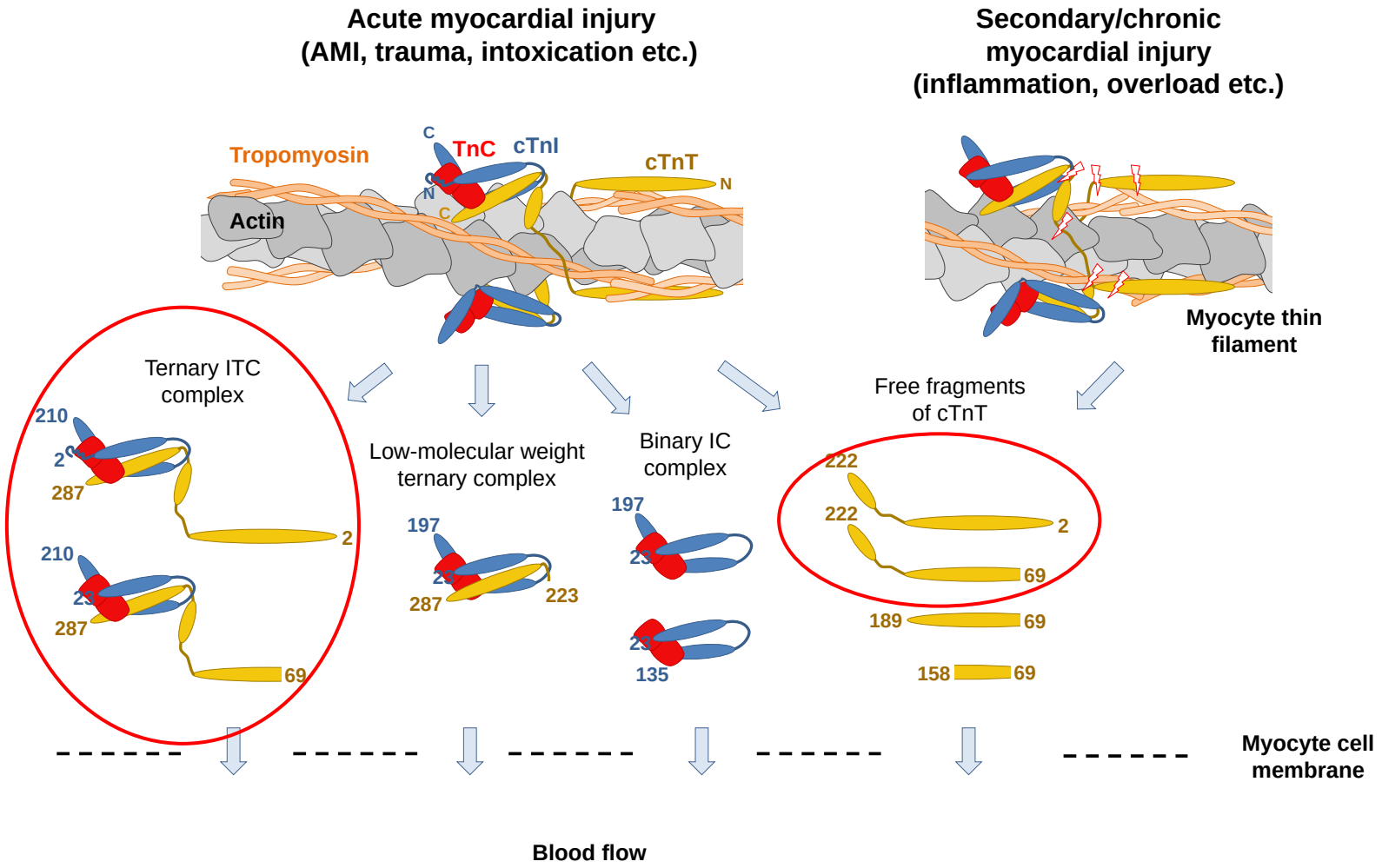
Troponins to discriminate between acute and chronic conditions?



- Detection of ternary ITC complex, full-sized or long cTnT to discriminate AMI from chronic conditions

Thanks for your attention!

Troponin I is released in bloodstream of patients with acute myocardial infarction not in free form but as complex

Aleksei G. Katrukha, Anastasia V. Ber, Kim Pettersson, Timo Lövgren, Liisa-Maria Vuopio-Pulkki

Clinical Chemistry 44:12 2433–2440 (1998)

Biochemical Factors Influencing Measurement of Cardiac Troponin I in Serum

Clin Chem Lab Med 1999; 37(11/12):1091–1095 © 1999 by Walter de Gruyter · Berlin · New York

New approach to standardisation of human cardiac Troponin I (cTnI)

A. KATRUKHA[1], A. BEREZNIKOVA[1], K. PETTERSSON[2], [1]HyTest LTD, Turku, Finland, [2]Department of Biotechnology, University of Turku, Turku, Finland.

Scand J Clin Lab Invest 1999; 59(Suppl 230):124-127.

Application of Recombinant Antibody Fragments for Troponin I Measurements

E. P. Altshuler[1]*, A. V. Vylegzhanina[2], I. A. Katrukha[1], A. V. Bereznikova[1], and D. V. Serebryanaya[1]

Clinical Chemistry 63:1 343–350 (2017)

Research Article

Development of a candidate secondary reference procedure (immunoassay based measurement procedure of higher metrological order) for cardiac troponin I: I. Antibody characterization and preliminary validation

Degradation of cardiac troponin I: implication for reliable immunodetection

Aleksei G. Katrukha, Anastasia V. Bereznikova, Vladimir L. Filatov, Tatiana V. Esakova, Olga V. Kolosova, Kim Pettersson, Timo Lövgren, Tamara V. Bulargina, Igor R. Trifonov, Nikolai A. Gratsiansky, Kari Pulkki, Liisa-Maria Voipio-Pulkki, and Nikolai B. Gusev

Clinical Chemistry 63:6 1094–1100 (2017)

Clinical Chemistry 64:7 1104–1112 (2018)

Enzymes and Protein Markers

Proteomics and Protein Markers

Full-Size Cardiac Troponin I and Its Proteolytic Fragments in Blood of Patients with Acute Myocardial Infarction: Antibody Selection for Assay Development

Ivan A. Katrukha, Alexander E. Kogan, Alexandra V. Vylegzhanina, Alexey V. Kharitonov, Natalia N. Tamm, Vladimir L. Filatov, Anastasia V. Bereznikova, Ekaterina V. Koshkina, and Alexey G. Katrukha

Anti-Cardiac Troponin Autoantibodies Are Specific to the Conformational Epitopes Formed by Cardiac Troponin I and Troponin T in the Binary Troponin Complex

Clinical Chemistry 65:7 000–000 (2019)

Ivan A. Katrukha, Olga V. Antipova, and Alexey G. Katrukha

Proteomics and Protein

EPITOPE MAPPING OF ANTI-TROPONIN I M

Vladimir L. Filatov, Aleksei G. Katrukha, Tatiana V. Esakova, Tamara V. Bulargina, Olga V. Nikolai B. Gusev

Biochemistry (Moscow), Vol. 64, No. 9, 1999, pp. 909-985. Translated from Original Russian Text Copyright © 1999 by Filatov, Katrukha, Bulargina, Gusev.

Thrombin-Mediated Degradation of Human Cardiac Troponin T

Ivan A. Katrukha, Alexander E. Kogan, Alexandra V. Vylegzhanina, Marina V. Serebryakova, Ekaterina V. Koshkina, Anastasia V. Bereznikova, and Alexey G. Katrukha

Clinical Chemistry 67:1 124–130 (2021)

Contents lists available at

Clinica Chim

journal homepage: www

ELSEVIER

Fragmentation of human cardiac troponin T after acute myocardial infarction

Ivan A. Katrukha, Natalia S. Riabkova, Alexander F. K., Alexandra V. Vylegzhanina, Kadriya Sh. Mukhary, Artur I. Zabolotskii, Ekaterina V. Koshk, G. Katrukha

ISSN 0006-2979, Biochemistry (Moscow), 2013, Vol. 78, No. 13, pp. 1447-1465. © Pleiades Publishing, Ltd., 2013. Original Russian Text © I. A. Katrukha, 2013, published in Uspekhi Biologicheskoi Khimii, 2013, Vol. 53, pp. 149-194.

Full-Size and Partially Truncated Cardiac Troponin Complexes in the Blood of Patients with Acute Myocardial Infarction

Alexandra V. Vylegzhanina, Alexander E. Kogan, Ivan A. Katrukha, Anastasia V. Bereznikova, Vladimir L. Filatov, Marina M. Alexey G. Katrukha, Ekaterina V. Ko, Essa P. B.

Proteomics and Protein

Troponin: Structure, Properties, and Mechanism of Functioning

V. L. Filatov, A. G. Katrukha, T. V. Bulargina, and N. V. Gusev

Biochemistry (Moscow), Vol. 64, No. 9, 1999, pp. 1155-1174. Original Russian Text Copyright © 1999 by Filatov, Katrukha, Bulargina, Gusev.

REVIEW

Myocardial Injury and the Release of Troponins I and T in the Blood of Patients

Ivan A. Katrukha and Alexey G. Katrukha

Human Cardiac Troponin Complex. Structure and Functions

I. A. Katrukha

Department of Biochemistry, Biological Faculty, Lomonosov Moscow State University, 119991 Moscow, Russia; E-mail: katrukha@soil.msu.ru

Received July 15,

Успехи биологической химии, т. 50, 2010, с. 203–258

ПОЛУЧЕНИЕ РЕКОМБИНАНТНЫХ АНТИТЕЛ И СПОСОБЫ УВЕЛИЧЕНИЯ ИХ АФФИННОСТИ

А. Г. КАТРУХА

Hytest

Q & A

Question & Answer

- Q: What additional information do we need to begin to figure out how to use the new advances intelligently?
- A: *Please see and listen the recorded video*

Question & Answer

- Q: What additional clinical studies are necessary?
- A: *Please see and listen the recorded video*

Question & Answer

- Q:What is the most sensitivity antibody you have to cardiac troponin I and T?
- A: According to our experience the performance of the monoclonal antibodies greatly depends on the type of the assay they are used in. And it may happen that an antibody that performs great in one type of the assay may not be the best for the other. So, our strategy is to develop and select several antibodies that are specific to the same region of the molecule and let the customer test all the panel and select the combination that suites best in each specific case. During the development process we are utilizing different applications and types of assays selecting the most sensitive antibodies from the thousands of candidates, so all mAbs that are present in our catalogue show good sensitivity and specificity. The new “R”-series (R1, R23, R33, R85) and “Y”-series (Y101, Y302, Y303, Y306, Y309, Y501, Y502, Y503, Y504, Y505, Y601 and Y603) of anti-troponin I mAbs, anti-IC complex mAb 20C6 possess very high sensitivity. As for detection of cTnT, we can distinguish mAbs TnT306 and TnT409 that show the best sensitivity and specificity.

Hytest

Question & Answer

- Q: What is your opinion about troponin immunoassays still missing standardization, though a ref material has been set up?
- A: Standardization of troponin immunoassays is a quite demanded procedure for many clinicians want to compare the results of measurements made by different immunoassays. On the other hand, different immunoassays utilize different methods of detection and different antibodies that are specific to the various parts of troponin molecule [1]. Also, troponins are present in blood not as homogeneous stable molecules, but as a mixture of various complexes and proteolytic fragments [2,3,4], the composition of this mixture changes in time after myocardial infraction [4] and, possibly, depends on the type of the blood sample used for analysis [5]. Meanwhile it was shown that utilization of the ternary native or recombinant troponin complex leads to significant harmonization of the results obtained by different immunochemical assays that utilize the antibodies specific to different epitopes of the cTnI molecule [6]. In this sense the utilization of a common calibrator might help to harmonize the results, obtained by different assays, though there are doubts that complete unification is possible, taken that different assays most likely detect different portions of troponin mixture present in blood of MI patients.
- [1] - High-Sensitivity* Cardiac Troponin I and T Assay Analytical Characteristics Designated by Manufacturer IFCC Committee on Clinical Applications of Cardiac Bio-Markers (C-CB) v062024 at https://ifccfiles.com/2024/03/High-Sensitivity-Cardiac-Troponin-I-and-T-Assay-Analytical-Characteristics-Designated-By-Manufacturer-v062024.pdf)
- [2] – Katrukha et al., 2023, Fragmentation of human cardiac troponin T after acute myocardial infarction doi: 10.1016/j.cca.2023.117281
- [3] – Katrukha et al., 2018, Full-Size Cardiac Troponin I and Its Proteolytic Fragments in Blood of Patients with Acute Myocardial Infarction: Antibody Selection for Assay Development, doi: 10.1373/clinchem.2017.286211
- [4] – Vylegzhanina et al., 2018, Full-Size and Partially Truncated Cardiac Troponin Complexes in the Blood of Patients with Acute Myocardial Infarction, doi: 10.1373/clinchem.2018.301127
- [5] - Influence of Anticoagulants on the Dissociation of Cardiac Troponin Complex in Blood Samples (doi: 10.3390/ijms25168919)
- [6] – Katrukha et al., 1999, New approach to standardisation of human cardiac Troponin I (cTnI),

Question & Answer

- Q:How we can make troponin Ag stable
- A: Our studies indicate that ternary complex is quite stable in a buffer solution in high concentrations utilized for storage of the standard (~0.1-1 mg/mL), but at lower concentrations ITC, indeed, is quite unstable and prone to dissociation and degradation especially in such matrixes as serum or plasma (please see the troponin booklet and [1]). Still, not all proteases that are responsible for the cleavage of cTnI and cTnT are identified and the proper inhibition cocktail that effectively preserves troponins from proteolysis is not yet found. On the other hand, our experience has shown that dilution of troponins in buffer solution containing additional proteins (e.g. BSA) may preserve the immunochemical activity of the analyte.

- [1] - Influence of Anticoagulants on the Dissociation of Cardiac Troponin Complex in Blood Samples (doi: 10.3390/ijms25168919)

Question & Answer

- Q: Differences between chimera antibody with native antibody regarding trooping assay kits
- A: Chimeric antibodies comprise the human Fc-fragment instead of the mouse one. This substitution may increase the stability of mAbs and decrease interference of HAMA and heterophile antibodies that are present in blood samples of some patients.

- Q: Are there any new cardiac vascular markers you recommended?
- A: It seems that the up to date consensus is that no cardiac markers outperform BNP or NT-proBNP as a biomarker of heart failure and cTnI and cTnT as a biomarker of MI. Some studies dedicated to the characterization of IGFBP fragments and cMyBP-C as biomarkers of cardiac complications are worth mentioning. The other promising area is detection of “long” TnT and ternary ITC complexes that were discussed in the present webinar.

Question & Answer

- Q:What factors detract from reliable sensitivity?
- A: This is a very important but broad question because there are many factors that influence the immunochemical detection of cardiac troponins. These include the affinity of the antibodies utilized in the assay; epitope specificity of the antibodies; their ability to form a stable pair in the assay; stability of the antigen (including a proper selection of a blood sample type); amount of the sample used for analysis; type of the label used for detection; method of detection etc.

Hytest

Question & Answer

- Q: When can we say that Troponin measurement is high sensitive?
- A: To be defined as high-sensitive, a troponin assay should have an analytical variation of less than 10% at the concentrations that correspond to the 99th percentile for that assay. Also, the concentration of troponins should be measurable (above the limit of detection) in more than 50% of healthy individuals in both males and females, separately [1, 2]. Generally, the LoD of modern high-sensitive troponin assays ranges between 0.5-3 ng/L [3].

- [1] - Apple et al. on behalf of the IFCC Task Force on Clinical Applications of Cardiac Bio-Markers. 2015, IFCC educational materials on selected analytical and clinical applications of high-sensitivity cardiac troponin assays.
- [2] – Wu et al., 2018, Clinical Laboratory Practice Recommendations for the Use of Cardiac Troponin in Acute Coronary Syndrome: Expert Opinion from the Academy of the American Association for Clinical Chemistry and the Task Force on Clinical Applications of Cardiac Bio-Markers of the International Federation of Clinical Chemistry and Laboratory Medicine
- [3] - High-Sensitivity* Cardiac Troponin I and T Assay Analytical Characteristics Designated by Manufacturer IFCC Committee on Clinical Applications of Cardiac Bio-Markers (C-CB) v062024 at https://ifccfiles.com/2024/03/High-Sensitivity-Cardiac-Troponin-I-and-T-Assay-Analytical-Characteristics-Designated-By-Manufacturer-v062024.pdf)

Question & Answer

- Q: Do free cTnI and cTnI in complex usually give similar signal levels in cTnI immunoassays?
- A: This depends on the antibodies that are utilized in the assay. There are some antibodies or antibody combinations that give comparable results, others do not. There are antibodies (e.g. TnI84) that are specific to the epitopes that are blocked by the other components of troponin complex and thus interact only with free cTnI or, as is in case of TnI84, with free cTnI or IC-complex but not with ITC.

Question & Answer

- Q: Is complex troponin more sensitve than troponin I for acute MI?
- A: The present evidence suggests that cTnI that is present in blood of MI patients is complexed with either TnC or with TnC and cTnT. No considerable amounts of free cTnI were detected in blood by us and others. We presume that, if appears, free cTnI is rapidly proteolyzed or eliminated from the blood flow. So, determination of cTnI in blood is a measurement of either IC or ITC complexes. But as it was mentioned during the webinar, recent studies suggest that the determination of ternary ITC complex can be more specific towards acute cardiac damage (including MI) then the measurement of total cTnI and might help discriminating MI from chronic cardiac diseases.

Hytest

Question & Answer

- Q: Do you have any recommendation for antibody pairs for detection of AMI?
- A: According to our experience the performance of the monoclonal antibodies greatly depends on the type of the assay they are used in. And it may happen that an antibody that performs great in one type of the assay may not be the best for the other. So, our strategy is to develop and select several antibodies that are specific to the same region of the molecule and let the customer test all the panel and select the combination that suites best in each specific case. During the development process we are utilizing different applications and types of assays selecting the most sensitive antibodies from the thousands of candidates, so all mAbs that are present in our catalogue show good sensitivity and specificity. The new “R”-series (R1, R23, R33, R85) and “Y”-series (Y101, Y302, Y303, Y306, Y309, Y501, Y502, Y503, Y504, Y505, Y601 and Y603) of anti-troponin I mAbs, anti-IC complex mAb 20C6 possess very high sensitivity. As for detection of cTnT, we can distinguish mAbs TnT306 and TnT409 that show the best sensitivity and specificity. Some other recommendations of antibody combinations that work best in our hands are listed in our catalogue.

Hytest

Question & Answer

- Q: How about using Aptamer instead of Ab?
- A: Indeed, there has been quite a few publications describing the utilization of aptamers for detection of cardiac troponins in recent years. But to our knowledge, aptamers do not outperform antibodies in terms of sensitivity and specificity. As we understand it there are also issues with the stability of aptamers.

- Q: Why would you use cTnT if the bias to chronic disease is so severe? cTnI seems far more relevant to AMI
- A: Indeed, this bias was described. This question was partially addressed by both Prof. Jaffe and Dr. Katrukha during the webinar – recent studies have shown that the measurement of the “long” cTnT and/or calculation of the ratio of “long” cTnT could be more specific to the acute myocardial damage then the measurement of total cTnT.

Question & Answer

- Q: If RF and heterophile Abs are concerns, why would there not be a recommendation to also monitor EBV mononucleosis?
- A: Indeed, Epstein-Barr virus infection is frequently accompanied by the increase of the heterophile antibody blood concentration. These antibodies are characterized by broad reactivity with antibodies of other animal species and thus may interfere with the mAbs of the immunochemical assay. One of the possible solutions on the stage of development of the assay is to use blocking agents (e.g. a mixture of polyclonal non-specific antibodies of different animal species) in the composition of the assay, the other – to utilize the specific mAbs of different animal origin (e.g. mouse-swine, mouse-goat, mouse-chimeric pairs) in the assay. We are not sure that monitoring of the EBV mononucleosis is possible and cost-effective for every immunochemical test performed in the clinical lab, but this may be an option when obtaining discordant results of the test.

Question & Answer

Thank you for the great questions before and during the event!

We tried to answer all of them, but if we missed yours for any reason, please don’t hesitate to contact our customer service.

Thank you!

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