Troponin, Confounding factors

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Confounding Factors

Table 2. Elevations of cardiac troponins without overt ischemic heart disease.[a]

- Trauma (including contusion, ablation, pacing, implantable cardioverter defibrillator firings including atrial defibrillators, cardioversion, endomyocardial biopsy, cardiac surgery, after interventional closure of atrial septal defects)
- Congestive heart failure—acute and chronic
- Aortic valve disease and hypertrophic obstructive cardiomyopathy with significant left ventricular hypertrophy
- Hypertension
- Hypotension, often with arrhythmias
- Postoperative noncardiac surgery patients who seem to do well
- Renal failure
- Critically ill patients, especially with diabetes, respiratory failure, gastrointestinal bleeding, sepsis
- Drug toxicity, e.g., adriamycin, 5-fluorouracil, herceptin, snake venoms, carbon monoxide poisoning
- Hypothyroidism
- Abnormalities in coronary vasomotion, including coronary vasospasm
- Apical ballooning syndrome
- Inflammatory diseases, e.g., myocarditis, parvovirus B19, Kawasaki disease, sarcoid, smallpox vaccination, or myocardial extension of bacterial endocarditis
- Post-PCI patients who appear not to have complications
- Pulmonary embolismPE, severe pulmonary hypertension
- Sepsis
- Burns, especially if total surface burn area is >30%
- Infiltrative diseases, including amyloidosis, hemochromatosis, sarcoidosis, scleroderma
- Acute neurological disease, including cerebrovascular accident, subarachnoid bleeds
- Rhabdomyolysis with cardiac injury
- Transplant vasculopathy
- Vital exhaustion

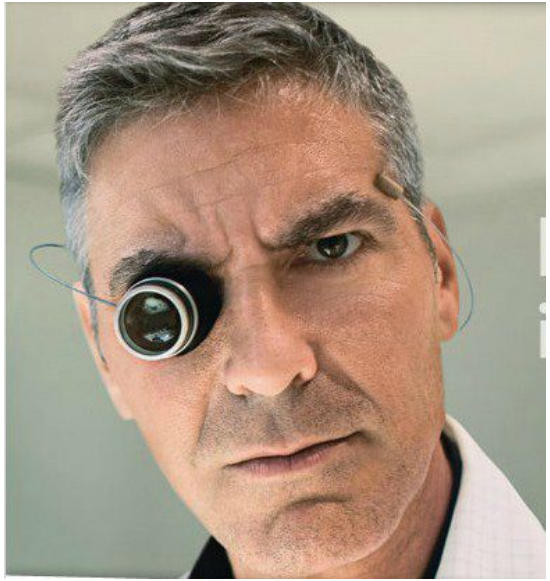

Table 3. Increased concentrations of BNP/NT-proBNP without overt heart failure (references).

- Inflammatory cardiac diseases *(3–5)*
- Systemic arterial hypertension with left ventricular hypertrophy *(6–8)*
- Pulmonary hypertension *(9–11)*
- Acute or chronic renal failure *(12, 13)*
- Ascitic liver cirrhosis *(14–16)*
- Endocrine disorders
  - Hyperaldosteronism *(17, 18)*
  - Adrenal tumors *(19)*
  - Hyperthyroidism *(20, 22)*

A false positive case of high-sensitivity cardiac troponin in a patient with acute chest pain: Analytical study of the interference

Baroni S.[a,b,*], Troiani E.[b], Santonocito C.[a,b], Moretti G.[b], De Luca C.[b], Antenucci M.[a], Urbani A.[a,b]

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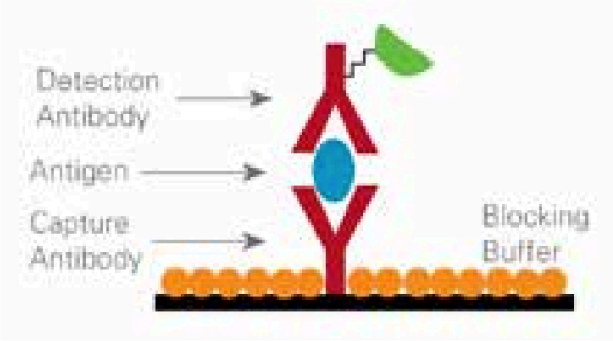
[b] *Università Cattolica del Sacro Cuore, Roma, Italy*

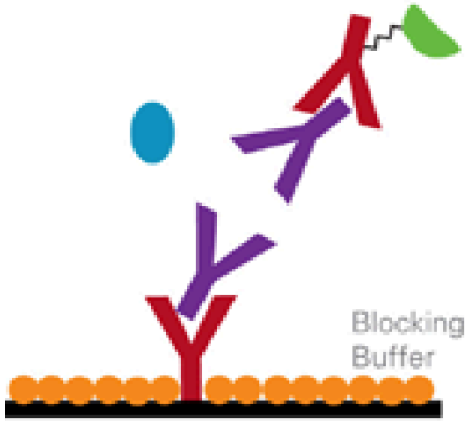
Kits	*Results*	*LOD*	*Cut-off*	*Method*
cTnI Ultra Siemens µg/L	0.012	0.006	0.040	*CLIA*
TNIH Centaur XPT Siemens ng/L	129	2.2	47	*CLIA*
Pathfast cTnI ng/L	9	1	27	*CLEIA*
Dimension Vista Siemens ng/L	114	2.0	57	*LOCI*
Vidas bioMérieux ng/L	36	1.5	19	*ELFA*
Singulex ng/L	1.8	0.14	8.67	*SMC*
Roche hs TnT ng/L	7	5	14	*ECLIA*

Baroni, S., Clinical Biochemistry

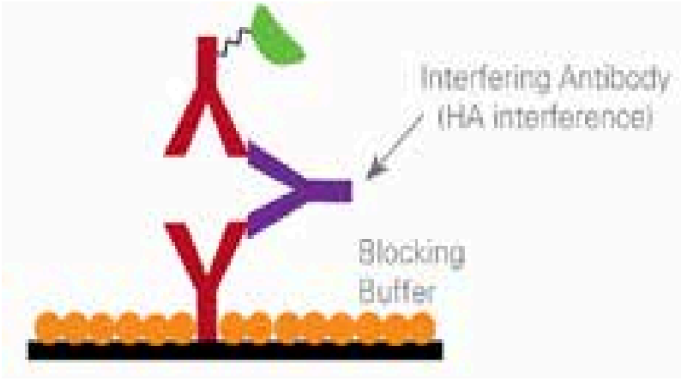
TRUE Positive Result



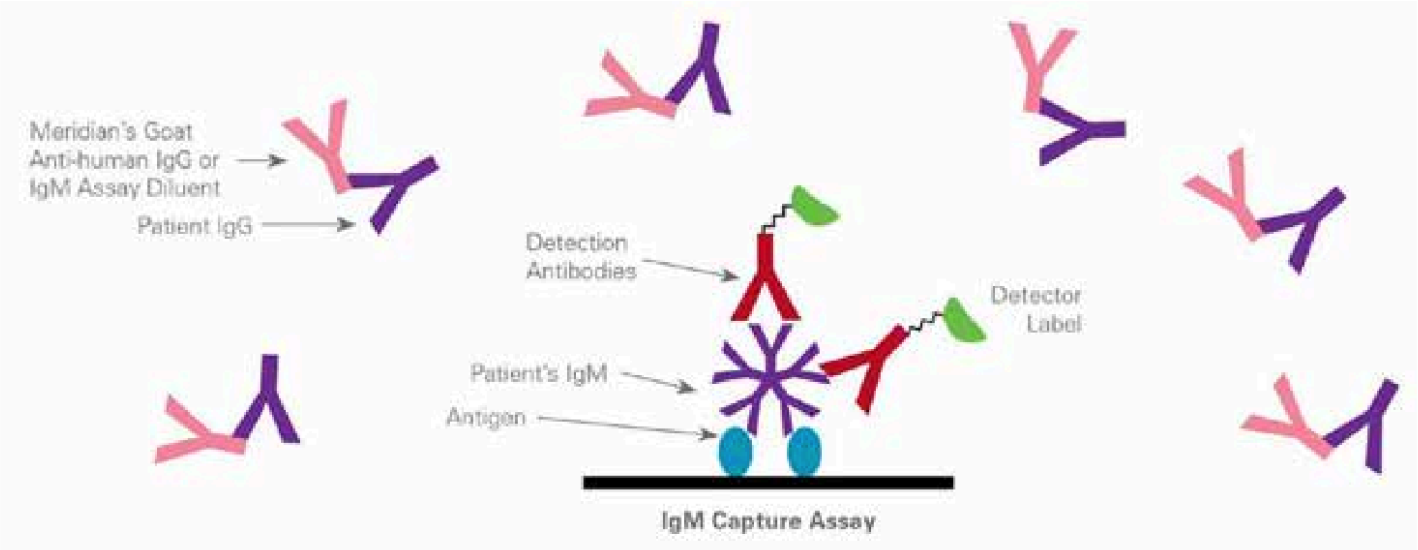
FALSE Negative Result



FALSE Positive Result



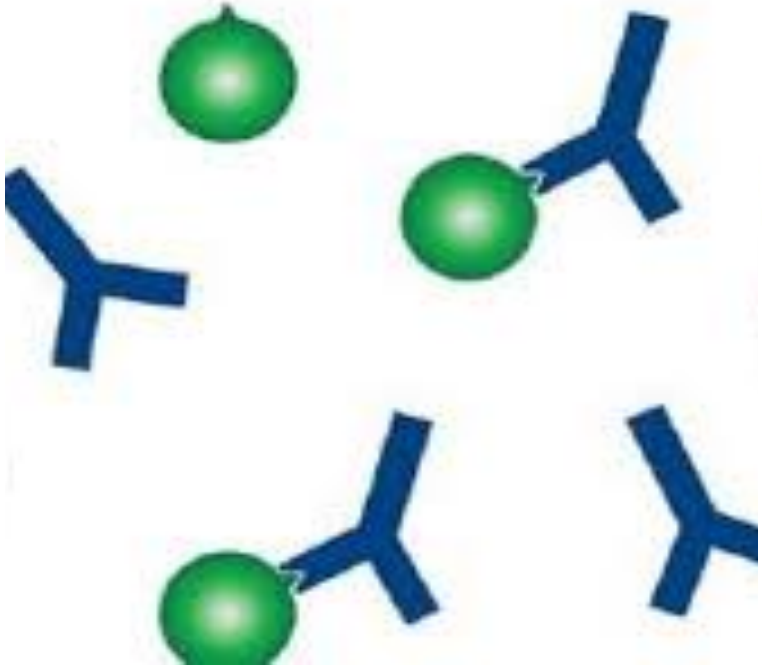
Heterophilic antibody interference

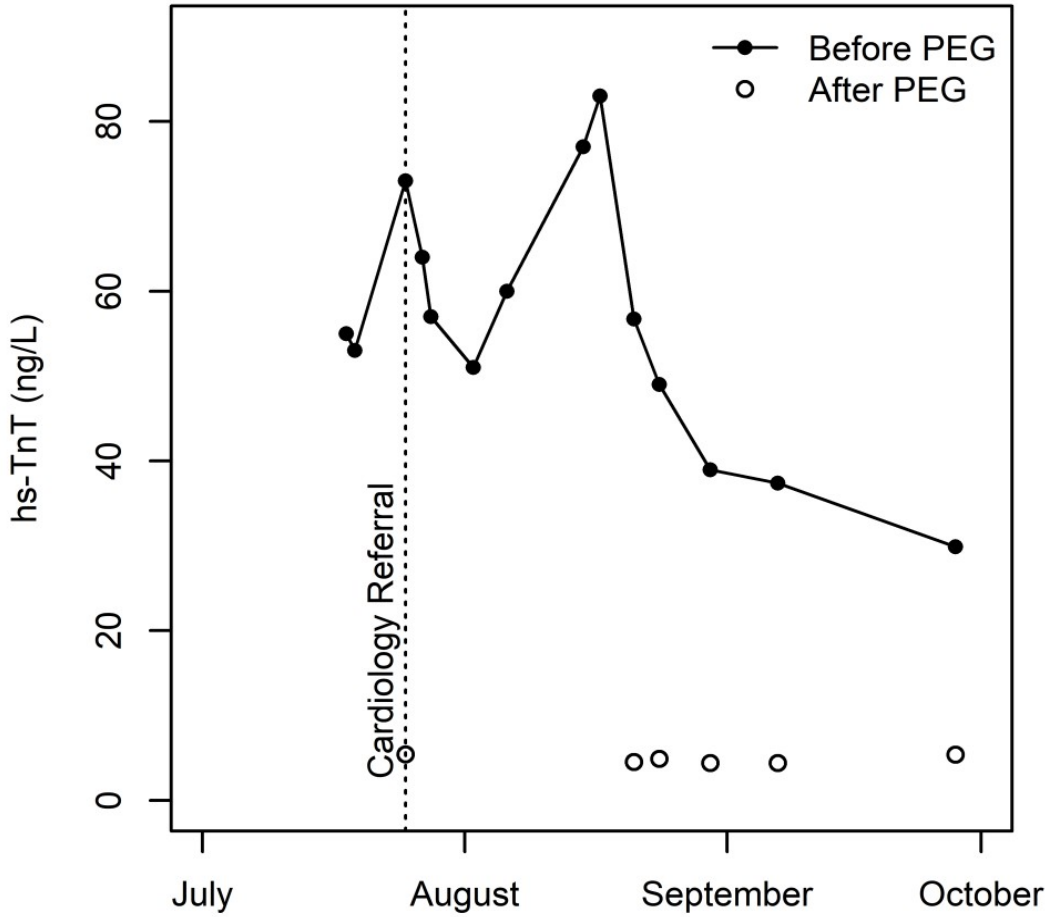


Heterophile blocking tube

MACROTROPONIN: MAKING FRIENDS WITH YOUR CARDIOLOGISTS

Janet Warner[1], George Mars





BIOTIN

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IFCC Paper

Amy K. Saenger, Allan S. Jaffe, Richard Body, Paul O. Collinson, Peter A. Kavsak, Carolyn S.P. Lam, Guillaume Lefèvre, Tobjørn Omland, Jordi Ordóñez-Llanos, Kari Pulkki and Fred S. Apple*

Cardiac troponin and natriuretic peptide analytical interferences from hemolysis and biotin: educational aids from the IFCC Committee on Cardiac Biomarkers (IFCC C-CB)

Prevalence of biotin supplement usage in outpatients and plasma biotin concentrations in patients presenting to the emergency department

Brooke M. Katzman[a], Alan J. Lueke[a], Leslie J. Donato[a], Allan S. Jaffe[a,b], Nikola A. Baumann[a,*]

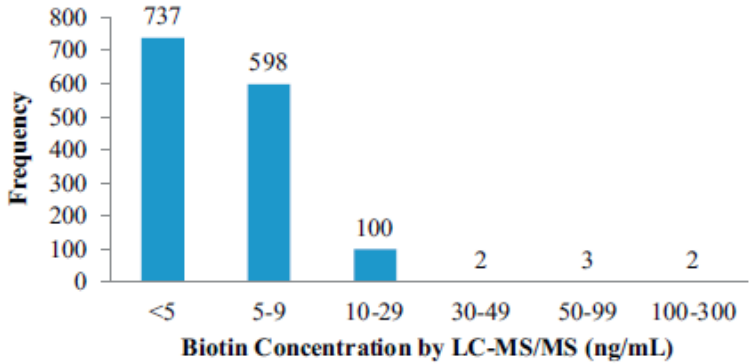
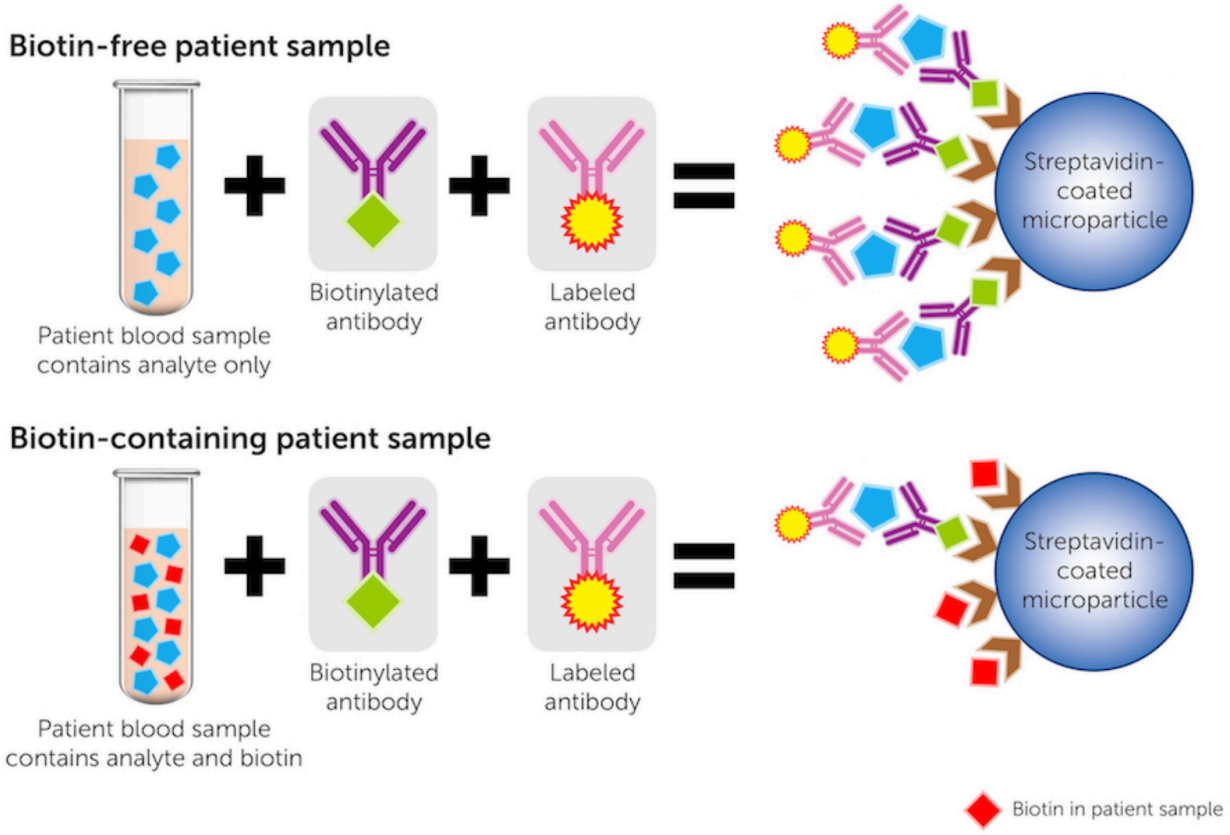


Fig. 1. Distribution of biotin concentrations in plasma samples from ED patients.

Quantitation of biotin in plasma samples from ED patients (n=1442) revealed that 7.4% (95% CI, 6.2–8.9%) had concentrations at or above the lowest known threshold (10 ng/mL) for biotin interference in Roche Diagnostics immunoassay tests.

Biotin Supplements Can Interfere With Cardiac Troponin Tests: FDA

One person died after excessive levels of biotin, also known as vitamin B7, skewed their troponin test results, according to the FDA.

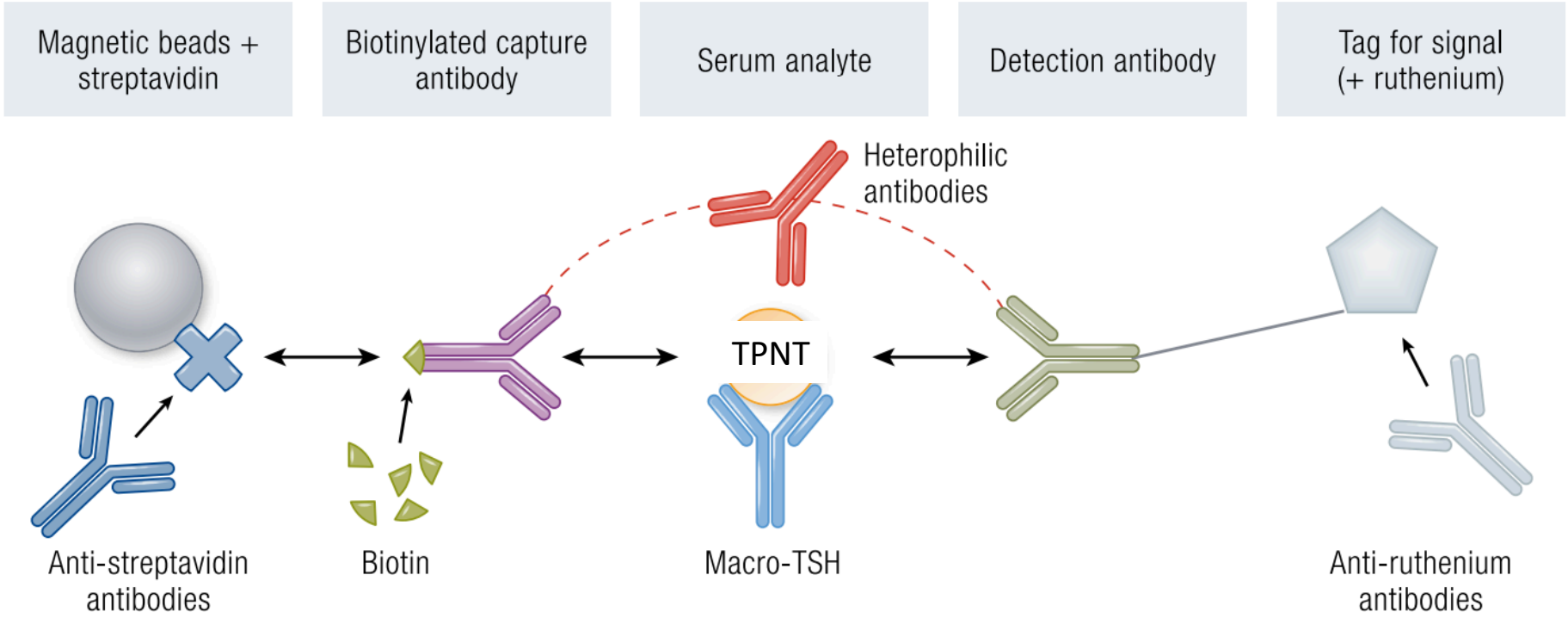


Biotin Interference on cardiac biomarkers

TNT (ng/L)	6768	1044,2	49,45	912	275,1
TNT R post-spiking	37,74	8,39	12,9	7,59	3,69
TNT R post-treatment	6852	500,1	45,68	769,7	146,8
NT-proBNP (pg/mL)	13615	11023	313,6	4470	260
NT-proBNP R post-spiking	91,71	91,43	5	30,51	5
NT-proBNP R post-treatment	12996	8562	372,5	4360	268
PCT (ng/mL)	0,488	5,96	0,162	6,38	0,055
PCT R post-spiking	0,02	0,086	0,156	0,085	0,038
PCT R post-treatment	0,477	3,77	0,21	6,46	0,043

Mean bias > 90%

(a) Two-sites immunoassays Troponin



How can we exclude interference in the laboratory

- Test by a different method
- Dilution series
- Heterophile blocking tube
- PEG (typically used for macro-forms)
- Biotin depleting device

« La trahison des images »

René Magritte 1929

Communication and Multidisciplinary Team Work

Thanks for your attention

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