The thromboxane A₂ pathway and its components are implicated in the progression of atherosclerosis and cardiovascular diseases. (CAD)

Thromboxane A₂ is clearly involved in CAD due to its acute and chronic role in promotion of vasoconstriction and platelet aggregation.

The success of low-dose aspirin in prevention of CAD is explained by platelet COX-1 inhibiting thromboxane A₂ biosynthesis.

Levels of urinary 11-dehydrothromboxane B₂ reflect activity of components of the thromboxane A₂ pathway that regulate thromboxane A₂ generation.

**1. Urinary 11-dehydro-thromboxane B₂ and mortality in patients with stable coronary artery disease**

2017 • Am J Cardiol • Clinical Research • Human • 449 Patients • 11-DHTXB2

“Urinary concentration of 11DHTXB2 was a strong independent risk factor for all-cause mortality among patients with stable CAD on aspirin therapy and may be a marker for patients with CAD who require more intensive secondary prevention measures.”

**2. Urinary 11-dehydro-thromboxane B₂ is associated with cardiovascular events and mortality in patients with atrial fibrillation**

2015 • AHJ • Clinical Research • Human • 837 Patients

“The novelty of the present study is our demonstration that urinary 11-dehydro-TxB₂ levels were associated with an increased risk of CVEs and CV death in an AF cohort already on OACs.”

**3. Incomplete inhibition of thromboxane biosynthesis by acetylsalicylic acid.**

2008 • Circulation • Clinical Research • Human • 3261 Patients • 11-DHTXB2
4. **Urinary 11-dehydro-thromboxane Bₙ as a predictor of acute myocardial infarction outcomes: results of leukotriene and thromboxane in myocardial infarction (LTMI) study.**

2016 • JAHA • Clinical Research • Human • 180 Patients • 11-DHTXB2

“Urinary 11-dehydro-thromboxane (TX)B₂ has been described as a potential predictive biomarker of major adverse cardiovascular events (MACEs) in high cardiac risk patients.”

“11-Dehydro-TXB₂ predicts 1-year cumulative MACEs in AMI patients and provides prognostic information on the left ventricular performance.”

5. **Risk factors for nonplatelet thromboxane generation after coronary artery bypass graft surgery.**

2016 • JAHA • Clinical Research • Human • 260 Patients • 11-DHTXB2

“A significant finding of our analysis was that U8-iso-PGF₂ₐ correlated directly with the incidence of early vein graft thrombosis. This suggests that therapies aimed at reducing oxidative stress might be a viable strategy to reduce nonplatelet TXA₂ generation and improve outcomes after cardiac surgery.”

6. **Aspirin-resistant thromboxane biosynthesis and the risk of myocardial infarction, stroke, or cardiovascular death in patients at high risk for cardiovascular events.**

2002 • Circulation • Clinical Research • Human • 488 Patients/488 Controls • 11-DHTXB2

“In aspirin-treated patients, urinary concentrations of 11-dehydro thromboxane B₂ predict the future risk of myocardial infarction or cardiovascular death. These findings raise the possibility that elevated urinary 11-dehydro thromboxane B₂ levels identify patients who are relatively resistant to aspirin and who may benefit from additional antiplatelet therapies or treatments that more effectively block in vivo thromboxane production or activity.”

7. **Age-related increase of thromboxane B₂ and risk of cardiovascular disease in atrial fibrillation.**

2016 • Oncotarget • Clinical Review • Human • 11-DHTXB2

“Urinary excretion of 11-dehydro-txb2 increases by advancing age, peaking after 70 years.”
8. **11-Dehydro thromboxane b2 levels after percutaneous transluminal angioplasty in patients with peripheral arterial occlusive disease during a one year follow-up period.**

2016 • J Physiol Pharmacol • Clinical Research • Human • 175 Patients • 11-DHTXB2

“Overall the mean TXB2 values immediately after PTA were significantly higher than either before the procedure (1524.4 pg/mg ± 1411.1 vs. 2098.1 pg/mg creatinine ± 1661.8; P=0.00002), the day after PTA, or at any other point during the study.”

“Moreover, preoperative TXB2 levels correlated well with the composite endpoints of death, myocardial infarction and stroke during the follow-up period.”

9. **Oxidative stress reflected by increased F2-isoprostanes is associated with increasing urinary 11-dehydro thromboxane B2 levels in patients with coronary artery disease.**

2016 • Thromb Res • Clinical Research • Humans • 11-DHTXB2

“Elevated 11dhTxB2 was found to increase the risk of adverse events in patients with stable CAD [12] and myocardial infarction.”

10. **The influence of low-grade inflammation on platelets in patients with stable coronary artery disease.**

2015 • Thromb Haemost • Review Article • Human • 11-DHTXB2

“Increased levels of hsCRP and IL-6 were independently associated with increased platelet aggregation and urine-11-dehydrothromboxane B2 levels (110). This association may be explained by aspirin-insensitive thromboxane generation derived from cyclooxygenase-2 in non-platelet cells.”

11. **Measurements of thromboxane production and their clinical significance in coronary heart disease.**

2012 • Thromb Haemost • Review Article • Human • 11-DHTXB2

“Residual TX production, as revealed by different methods, may derive from COX-1 or COX-2.”

“Extra-platelet sources may contribute to aspirin-insensitive TX generation: monocytes/macrophages and vascular endothelial cells express COX-2 in response to inflammatory stimuli, and the up regulation of COX-2 activity may account for a TX biosynthesis not sensitive to once daily low-dose aspirin.”
12. The improvement of walking abilities and endothelial function after the supervised training treadmill program (STTP) in patients with peripheral artery disease (PAD) is not related to prostacyclin and thromboxane release.

2016 • Int. J Cardiac Clinical Research • Human • 59 Patients • 11-DHTXB2

13. Relation of fish oil supplementation to markers of atherothrombotic risk in patients with cardiovascular disease not receiving lipid-lowering therapy.

2015 • Am J Cardiol Clinical Research • Human • 259 Patients • 11-DHTXB2

“Fish oil supplementation (FOS) is known to have cardiovascular benefits. Patients on FOS had lower urinary 11-dehydrothromboxane B2 levels regardless of lipid-lowering therapy.”

Thromboxane A2 pathway schematics