



# The TIMI Trials

## BIBLIOGRAPHY JANUARY 1987 - OCTOBER 2008

### TIMI I

**OBJECTIVE: To compare the efficacy of tissue plasminogen activator and streptokinase for reperfusion of the infarct-related artery in ST elevation myocardial infarction.**

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## **TIMI IIA**

**OBJECTIVE: To compare the results of 3 strategies of coronary angiography and angioplasty following intravenous thrombolytic therapy for ST elevation myocardial infarction: immediate invasive, delayed invasive (18-48 h), and a conservative strategy.**

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## **TIMI IIB**

### **OBJECTIVES:**

**To compare the effects of an invasive vs. conservative strategy following thrombolysis with rtPA among patients with ST elevation myocardial infarction.**

**To compare the effect of immediate vs. delayed (6 days) metoprolol therapy among patients with ST elevation myocardial infarction treated with rtPA (a substudy of the TIMI II trial).**

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### **TIMI IIIA**

**OBJECTIVE: To evaluate the effect of rtPA vs. placebo on the culprit coronary lesion in patients with unstable angina or non-Q-wave myocardial infarction.**

1. **TIMI IIIA Investigators. Early effects of tissue-type plasminogen activator added to conventional therapy on the culprit lesion in patients presenting with ischemic cardiac pain at rest. Results of the Thrombolysis in Myocardial Ischemia (TIMI IIIA) Trial. *Circulation*. 1993;87:38-52.**
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### **TIMI IIIB**

**OBJECTIVE: To assess the early effects of rtPA vs. placebo and the clinical efficacy of an early invasive vs. conservative strategy in a 2x2 factorial design among patients with unstable angina and non-Q-wave myocardial infarction.**

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### **TIMI III Registry**

**OBJECTIVE: An observational study to enumerate and investigate the natural history and response to treatment of patients presenting with unstable angina and non-Q-wave myocardial infarction.**

1. Stone PH, Thompson B, Anderson HV, Kronenberg MW, Gibson RS, Rogers WJ, Diver DJ, Theroux P, Warnica JW, Nasmith JB, Kells C, Kleiman N, McCabe CH, Schactman M, Knatterud GL, Braunwald E, for the TIMI III Registry Study Group. Influence of race, sex, and age on management of unstable angina and non-Q-wave myocardial infarction: The TIMI III Registry. *JAMA*. 1996;275:1104-1112.
2. Kleiman NS, Anderson HV, Rogers WJ, Theroux P, Thompson B, Stone PH. Comparison of outcome of patients with unstable angina and non-Q-wave acute myocardial infarction with and without prior coronary artery bypass grafting (Thrombolysis in Myocardial Ischemia III Registry). *Am J Cardiol* 1996; 77:227-31.
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9. Sharis PJ, Cannon CP, Rogers WJ, McCabe CH, Murphy S, Gibson CM, Stone PH, Braunwald E. Predictors of mortality, coronary angiography, revascularization in unstable angina pectoris and acute non-ST elevation myocardial infarction (the TIMI III Registry). *Am J Cardiol* 2002;90:1154-6.

#### **TIMI 4**

**OBJECTIVE: To compare the efficacy of front loaded tPA vs. APSAC vs. the combination of reduced dose tPA and APSAC for treatment of patients presenting within 6 hours of onset of ST elevation myocardial infarction.**

1. Cannon CP, McCabe CH, Diver DJ, Herson S, Greene RM, Shah PK, Sequeira RF, Laya F, Kirshenbaum JM, Magorien RD, Palmeri RF, Davis V, Gibson CM, Poole WK, Braunwald E for the TIMI 4 Investigators. Comparison of front-loaded recombinant tissue-type plasminogen activator, anistreplase and combination thrombolytic therapy for acute myocardial infarction: results of the Thrombolysis in Myocardial Infarction (TIMI) 4 trial. *J Am Coll Cardiol* 1994;24:1602-10.
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22. Barr SA, Zaret BL, Cannon CP, Wackers FJT, and the TIMI 4 and 5 Investigators. Does decreasing defect size in serial quantitative planar Tc-99 sestamibi imaging following thrombolytic therapy for acute myocardial infarction correlate with improved left ventricular function? *Circulation* 1993;88:I-487.
23. Wackers FJT, Cannon CP, McMahon M, Zaret BL, and TIMI Investigators. Natural history of serial intrahospital quantitative planar Tc-99 sestamibi imaging following thrombolytic therapy for acute myocardial infarction. *J Am Coll Cardiol* 1993;21 (Suppl. A):249A.
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9. Zahger D, Cercek B, Cannon CP, Jordan M, Shah PK, for the TIMI-4 Investigators. Thrombolytic therapy for acute myocardial infarction in patients with prior coronary bypass surgery. Results from the Thrombolysis in Myocardial Infarction (TIMI) 4 trial. *J Thromb Thrombolysis* 1995;2:45-50.
10. Birnbaum Y, Kloner RA, Sclarovsky S, Cannon CP, McCabe CH, Davis VG, Zaret BL, Wackers TJ, Braunwald E. Distortion of the terminal portion of the QRS on the admission electrocardiogram in acute myocardial infarction and correlation with infarct size and long-term prognosis (Thrombolysis in Myocardial Infarction 4 Trial). *Am J Cardiol* 1996;78:396-403.
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14. Gibson CM, Marble SJ, Rizzo MJ, Moynihan J, McLean C, Ryan K, Sparano A, Piana RN, McCabe C, Cannon CP. Relation between injections before 90-minute angiography and coronary patency: results of the thrombolysis in myocardial infarction 4 trial. *Am Heart J* 1997;134:351-4.
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20. Ryan KA, Rizzo M, Kelley MB, McCabe CH, Marble SJ, Cannon CP, Gibson CM. Relationship between the presence and duration of chest pain and blood flow at 90 minutes following thrombolytic administration. *J Am Coll Cardiol* 1999;33(Suppl A):375A.
21. Gibson CM, Murphy SA, Rizzo MJ, Ryan KA, Marble SJ, McCabe CH, Cannon CP, Van de Werf F, Braunwald E, for the TIMI Study Group. Relationship between TIMI frame count and clinical outcomes after thrombolytic administration. *Circulation* 1999;99:1945-1950.
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23. Kloner RA, Shook T, Cannon CP, Przyklenk K. Ischemic preconditioning: implications for the geriatric heart. *Am J Geriatr Cardiol* 2001;10:145-8.
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## **TIMI 5**

**OBJECTIVE: To evaluate the safety and efficacy of several doses of hirudin vs. unfractionated heparin in combination with front-loaded tPA for the treatment of patients presenting with ST elevation myocardial infarction.**

1. Cannon CP, McCabe CH, Henry TD, Schweiger MJ, Gibson RS, Mueller HS, Becker RC, Kleiman NS, Haugland JM, Anderson JL, Sharaf BL, Edwards SJ, Rogers WJ, Williams DO, Braunwald E. for the TIMI 5 Investigators. A pilot trial of recombinant desulfatohirudin compared with heparin in conjunction with tissue-type plasminogen activator and aspirin for acute myocardial infarction: results of the Thrombolysis in Myocardial Infarction (TIMI) 5 trial. *J Am Coll Cardiol* 1994;23:993-1003.
2. Loscalzo J, Abdenschein D, Eisenberg P, Becker R, George D, McCabe C, Sobel B, Braunwald E, for the TIMI 5 Investigators. Comparative effects of heparin and hirudin on fibrinolytic and thrombotic activities during tissue type plasminogen activator therapy. *Circulation* 1993;88.
3. Sharaf BL, Miele N, Ferreira P, McKendall GR, Williams DO. Culprit lesion changes in acute myocardial infarction: a TIMI 5 comparison of patients treated with t-PA and either heparin or hirudin. *J Am Coll Cardiol* 1993;21:419A.
4. Wackers FJT, Cannon CP, McMahon M, Zaret BL, and TIMI Investigators. Natural history of serial intrahospital quantitative planar Tc-99 sestamibi imaging following thrombolytic therapy for acute myocardial infarction. *J Am Coll Cardiol* 1993;21 (Suppl. A):249A.
5. Cannon CP, Becker RC, Loscalzo J, Gallo P, Henis M, Edwards SJ, McCabe CH, Braunwald E, for the TIMI 5 Investigators. Usefulness of APTT to predict bleeding for hirudin (and heparin). *Circulation* 1994;90[Pt. 2]:I-563.
3. Boisjolie CR, Sharkey SW, Cannon CP, Brunette D, Haugland JM, Thatcher JL, Henry TD. Impact of a thrombolysis research trial on time to treatment for acute myocardial infarction in the emergency department. *Am J Cardiol* 1995;76:396-8.
4. Becker RC, Cannon CP, George D, Loscalzo J, for the TIMI 5 Investigators. Toward establishing anticoagulation guidelines for intravenous heparin administration among patients with myocardial infarction given tissue plasminogen activator. *J Am Coll Cardiol* 1995;Special Issue:309A.
5. Henry TD, Becker RC, Cannon CP, McCabe CH, Loscalzo J, for the TIMI 5 Investigators. Is there a circadian variation in anticoagulant response to hirudin following acute myocardial infarction? *J Am Coll Cardiol* 1995;Special issue:310A.
6. Scharfstein JS, Abdenschein DR, Eisenberg PR, George D, Cannon CP, Becker RC, Sobel B, Cupples LA, Braunwald E, Loscalzo J. Usefulness of fibrinogenolytic and procoagulant markers during thrombolytic therapy in predicting clinical outcomes in acute myocardial infarction. TIMI-5 Investigators. *Thrombolysis in Myocardial Infarction. Am J Cardiol* 1996;78:503-10.
6. Becker RC, Cannon CP, Ma Y, Hurley T, Hebert J. A composite and practical view of standard coagulation monitoring in the identification of patients at risk for major hemorrhage. *J Am Coll Cardiol* 1996;27 (Suppl. A):81A-82A.
7. Becker RC, Hebert J, Hurley T, Ma Y, Cannon CP, for the TIMI 5 Hemostasis and Thrombosis Study Group. Early aPTT measurement are not a surrogate for in vivo thrombin inhibition among patients receiving thrombolytic therapy and adjunctive anticoagulation. *J Am Coll Cardiol* 1996;27(Suppl. A):11A-12A.

## **TIMI 6**

**OBJECTIVE: To compare three doses of hirudin vs. unfractionated heparin in combination with streptokinase for patients with ST elevation myocardial infarction.**

1. Lee LV, for the TIMI 6 Investigators. Initial experience with hirudin and streptokinase in acute myocardial infarction: results of the Thrombolysis in Myocardial Infarction (TIMI) 6 trial. *Am J Cardiol* 1995;75:7-13.

### **TIMI 7**

**OBJECTIVE:** To evaluate the safety and efficacy of several doses of hirulog in comparison with unfractionated heparin for the treatment of unstable angina.

1. Fuchs J, Cannon CP and the TIMI 7 Investigators. Hirulog in the treatment of unstable angina. Results of the Thrombin Inhibition in Myocardial Ischemia (TIMI) 7 trial. *Circulation* 1995;92:727-33.
2. Borzak S, Cannon CP, Kraft PL, Douthat L, Becker RC, Palmeri ST, Henry T, Hochman JS, Fuchs J, Antman EM, McCabe C, Braunwald E. Effects of prior aspirin and anti-ischemic therapy on outcome of patients with unstable angina. TIMI 7 Investigators. *Thrombin Inhibition in Myocardial Ischemia*. *Am J Cardiol* 1998;81:678-81.

### **TIMI 8**

**OBJECTIVE:** To compare the efficacy of hirulog with unfractionated heparin for the treatment among patients presenting with unstable angina and non-Q-wave myocardial infarction.

1. Antman EM, McCabe CH, Braunwald E. Bivalirudin as a replacement for unfractionated heparin in unstable angina/non-ST-elevation myocardial infarction: observations from the TIMI 8 trial. *Thrombolysis in Myocardial Infarction*. *Am Heart J* 2002;143:229-34.

### **TIMI 9A**

**OBJECTIVE:** To compare the safety and efficacy of intravenous hirudin to unfractionated heparin as adjunctive therapy to fibrinolysis and aspirin among patients presenting with ST elevation myocardial infarction.

1. Antman EM, for the TIMI 9A Investigators. Hirudin in acute myocardial infarction. Safety report from the Thrombolysis and Thrombin Inhibition in Myocardial Infarction (TIMI) 9A Trial. *Circulation* 1994;90:1624-30.

### **TIMI 9B**

**OBJECTIVE:** To compare the efficacy of a lower dose of intravenous hirudin to unfractionated heparin as adjunctive therapy to fibrinolysis and aspirin among patients presenting with ST elevation myocardial infarction.

1. Antman EM, for the TIMI 9B Investigators. Hirudin in acute myocardial infarction: Thrombolysis and Thrombin Inhibition in Myocardial Infarction (TIMI) 9B trial. *Circulation* 1996;94:911-921.

2. Antman EM, Braunwald E. Trials and tribulations of thrombin inhibition [editorial]. *Eur Heart J* 1996;17:971-3.
3. Antman EM, McCabe CH, Cannon CP, Barbash GI, Mueller HS, Gallo P. Prevention of Q wave development with thrombolytic therapy does not predict better short-term prognosis. *Circulation* 1996;94[Suppl. I]:I-381.
4. Paul S, Antman E, McCabe C, Braunwald E. Insights from TIMI 9B on sex differences in prognosis after acute myocardial infarction: development and validation of a clinical index to predict outcome. *Circulation* 1997;96:I-259.
5. Antman EM. Another chapter of the antithrombin story has been written. [editorial]. *Eur Heart J* 1997;18:1365-7.
6. Giugliano RP, Antman EM, Braunwald E. Reexamination of the thrombin hypothesis: what we have learned from TIMI 9B and GUSTO IIb. *J Thromb Thrombolysis* 1997;4:321-324.
7. Kloner RA, Shook T, Antman EM, Cannon CP, Przyklenk K, Yoo K, McCabe CH, Braunwald E. Prospective temporal analysis of the onset of preinfarction angina versus outcome: an ancillary study in TIMI-9B. *Circulation* 1998;97:1042-1045.
8. Becker RC, Hochman JS, Cannon CP, Spencer FA, Ball SP, Rizzo MJ, Antman EM. Fatal cardiac rupture among patients treated with thrombolytic agents and adjunctive thrombin antagonists: observations from the Thrombolysis and Thrombin Inhibition in Myocardial Infarction 9 Study. *J Am Coll Cardiol* 1999;33:479-87.
9. Cannon CP, Rizzo MJ, Antman EM, McCabe CH, Gibson CM, Braunwald E. Validation of a multivariate model for risk stratification in acute MI: Results from TIMI 9B. *J Am Coll Cardiol* 1999;33(Suppl. A):396A.
10. Direct Thrombin Inhibitor Trialists' Collaborative Group. Direct thrombin inhibitors in acute coronary syndromes: principal results of a meta-analysis based on individual patients' data. *Lancet* 2002;359:294-302.

### **TIMI 9 Registry:**

#### **OBJECTIVES:**

**To assess management strategies and the outcomes of patients presenting with ST elevation myocardial infarction in the current era of aggressive reperfusion strategies.**

**To assess the outcomes of patients presenting with ST elevation myocardial infarction who are ineligible for fibrinolytic therapy.**

1. Cannon CP, Bahit MC, Haugland JM, et al. Underutilization of evidence-based medications in acute ST elevation myocardial infarction: Results of the Thrombolysis in Myocardial Infarction (TIMI) 9 Registry. *Crit Path Cardiol* 2002;1:44-52.
2. Henry TD, Haugland JM, Berger C, Gleason R, Antman EM, Sharkey SW, for the TIMI 9 Registry Investigators. Is "door to needle" time, unadjusted for severity of illness a suitable measure of mortality risk in patients with acute myocardial infarction? *Circulation* 1995;92(Suppl. I):I-775-776.
3. Steingart RM, McKendall GR, Cannon CP, Macina G, Bilodeau S, Pier M, Kikel M, McCabe CH, Braunwald E, for the TIMI 9 Registry Investigators and Coordinators. Resolution of chest pain and ST segment elevation in acute myocardial infarction and the decision to give reperfusion therapy: Results from the TIMI 9 Registry. *Circulation* 1995;92(Suppl. I):I-205-206.
4. Paul S, McCabe CH, Antman EM. Risk stratification for acute myocardial infarction in the emergency department. *Circulation* 1997;96:I-182.
5. Bahit MC, Cannon CP, Antman EM, et al. Critical pathway for acute ST-segment elevation myocardial infarction: evaluation of the potential impact in the TIMI 9 Registry. *Crit Pathways Med* 2002;1:44-52.

6. Bahit MC, Cannon CP, Antman EM, Gibson CM, Murphy S, McCabe CH, Braunwald E. Direct comparison of characteristics, treatment, and outcomes of patients enrolled versus patients not enrolled in a clinical trial at centers participating in the TIMI 9 trial and TIMI 9 registry. *Am Heart J* 2002;145:109-117.

### **TIMI 10A**

**OBJECTIVE: To evaluate the pharmacokinetics, safety and efficacy of several doses of TNK-tPA among patients presenting with acute ST elevation myocardial infarction.**

1. Cannon CP, McCabe CH, Gibson CM, Ghali M, Sequeira RF, McKendall GR, Breed J, Modi NB, Fox NL, Tracy RP, Love TW, Braunwald E. TNK-tissue plasminogen activator in acute myocardial infarction. Results of the Thrombolysis in Myocardial Infarction (TIMI) 10A dose- ranging trial. *Circulation* 1997;95:351-6.
2. Rizzo MJ, Cannon CP, McLean C, Martin NE, Mukesh G, Marble SJ, Dodge T, Gibson M, for the TIMI 10A Investigators. Relationship between timing of vessel opening after thrombolysis and flow at 90 minutes. *Circulation* 1996;94[Suppl. I]:I-440.
3. Tanasijevic MJ, Cannon CP, Wybenga DR, Fischer GA, Grudzien C, Gibson CM, Winkelman JW, Antman EM, Braunwald E. Myoglobin, creatine kinase MB, and cardiac troponin-I to assess reperfusion after thrombolysis for acute myocardial infarction: results from TIMI 10A. *Am Heart J* 1997;134:622-30.
5. McLean C, Rizzo M, Ryan K, McCabe C, Cannon CP, Gibson M, Braunwald E, for the TIMI 10A Investigators. Predictors of slowed non-culprit blood flow post thrombolysis. *J Am Coll Cardiol* 1997;29 (Suppl. A):131A.
6. Rizzo M, Dotani I, McLean C, Ryan K, McCabe CH, Tanasijevic M, Cannon C, Gibson M, Braunwald E, for the TIMI 10A Trialists. Persistent myoglobin elevation is associated with slower flow in patent culprit arteries following successful thrombolysis. *J Am Coll Cardiol* 1997;29 (Suppl. A):132A.
4. Modi NB, Eppler S, Breed J, Cannon CP, Braunwald E, Love TW. Pharmacokinetics of a slower clearing tissue plasminogen activator variant, TNK-tPA, in patients with acute myocardial infarction. *Thromb Haemost* 1998;79:134-9.

### **TIMI 10B**

**OBJECTIVE: To compare the angiographic efficacy and safety of several doses of TNK with front loaded rtPA for the treatment of ST elevation myocardial infarction.**

1. Cannon CP, Gibson CM, McCabe CH, Adgey AA, Schweiger MJ, Sequeira RF, Grollier G, Giugliano RP, Frey M, Mueller HS, Steingart RM, Weaver WD, Van de Werf F, Braunwald E. TNK-tissue plasminogen activator compared with front-loaded alteplase in acute myocardial infarction: results of the TIMI 10B trial. *Circulation* 1998;98:2805-14.
2. Gibson M, McLean C, Rizzo MJ, Martin NE, Marble SJ, Dotani I, McCabe CH, Cannon CP, Braunwald E, for the TIMI 10 Investigators. Use of the TIMI frame count to compare flow at 90 min. after t-PA vs. TNK administration. *Circulation* 1996;94[Suppl. I]:I-89.
3. Gibson M, Rizzo MJ, McLean C, Sparano AM, Ryan K, Moynihan J, Ralston A, Dodge T, Cannon CP, Braunwald E. Adjunctive stenting following thrombolysis in TIMI 10A & B. *Circulation* 1997;96(Suppl. I):I-328.
4. Gibson M, Cannon CP, McCabe CH, Van de Werf FJ, Braunwald E. A randomized comparison of TPA with TNK using the TIMI Frame Count: Results of TIMI 10B. *Circulation* 1997;96(Suppl. I):I-330-I-331.
5. Goel M, Rizzo MJ, Syed J, Dodge JT, Al Mousa E, Marble SJ, Coulter SA. Relationship between proximal and distal lesion location and baseline ST-segment changes in acute myocardial infarction. *Circulation* 1998;98:I-79.

6. Gibson M, Schweiger M, Sequeira RF, Frey M, Cannon CP, Williams DO, Van de Werf F, Braunwald E, for the TIMI 10B Study Group. Outcomes of adjunctive PTCA/stenting for TIMI grade 2 flow following thrombolysis. *J Am Coll Cardiol* 1998;31(Suppl. A):231A.
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25. Murphy SA, Gibson CM, Van de Werf F, McCabe CH, Cannon CP. Comparison of errors in estimating weight and in dosing of single-bolus tenecteplase with tissue plasminogen activator (TIMI 10B and ASSENT I). *Am J Cardiol* 2002;90:51-4.
26. Gibson CM, Murphy SA, James D, Wong GC, Cannon CP, Giugliano RP, Antman EM, Braunwald E. Is recurrent myocardial infarction following thrombolytic administration associated with long-term mortality? *J Am Coll Cardiol* 2002;35(Suppl A):280A.

### **ASSENT I-TIMI 10C**

**OBJECTIVE: To compare the safety of several doses of TNK-tPA with rtPA for the treatment of ST elevation myocardial infarction.**

1. Van de Werf F, Cannon CP, Luyten A, Houbracken K, McCabe CH, Berioli S, Bluhmki E, Sarelin H, Wang-Clow F, Fox NL, Braunwald E, for the ASSENT-1 Investigators. Safety assessment of single-bolus administration of TNK tissue-plasminogen activator in acute myocardial infarction: the ASSENT-1 trial. *Am Heart J* 1999;137:786-791.
2. Fox NL, Cannon CP, Berioli S, Wang-Clow F, Danays T, Sarelin H, Braunwald E, Van de Werf F. Rates of serious bleeding requiring transfusion in AMI patients treated with TNK-tPA. *J Am Coll Cardiol* 1999;33(Suppl A):353A.
3. Wang-Clow F, Fox NL, Cannon CP, Gibson CM, Berioli S, Bluhmki E, Danays T, Braunwald E, Van der Werf F, Stump DC. Determination of a weight-adjusted dose of TNK-tissue plasminogen activator. *Am Heart J* 2001;141: 33-40.

### **TIMI 11A**

**OBJECTIVE: To compare the safety and tolerability of two weight-adjusted regimens of subcutaneous injections of enoxaparin among patients presenting with unstable angina or non-Q-wave myocardial infarction.**

1. The Thrombolysis in Myocardial Infarction (TIMI) 11A Trial Investigators. Dose-ranging trial of enoxaparin for unstable angina: results of TIMI 11A. *J Am Coll Cardiol* 1997;29:1474-82.
2. Morrow DA, Rifai N, Antman EM, Weiner DL, McCabe CH, Cannon CP, Braunwald E. C-reactive protein is a potent predictor of mortality independently and in combination with troponin T in acute coronary syndromes: a TIMI 11A substudy. *J Am Coll Cardiol* 1998;31:1460-1465.
3. Antman EM, Sacks DB, Rifai N, McCabe CH, Cannon CP, Braunwald E. Time to positivity of a rapid bedside assay for cardiac-specific troponin T predicts prognosis in acute coronary syndromes: A Thrombolysis in Myocardial Infarction (TIMI) 11A Substudy. *J Am Coll Cardiol* 1998;31:326-330.
4. Morrow DA, Rifai N, Antman EM, Weiner DL, McCabe CH, Cannon CP, Braunwald E. Serum amyloid A predicts early mortality in acute coronary syndromes: a TIMI 11A substudy. *J Am Coll Cardiol* 2000; 35: 358-362.

### **TIMI 11B**

**OBJECTIVE: To evaluate the safety and efficacy of subcutaneous enoxaparin compared with unfractionated heparin for the treatment of patients presenting with unstable angina or non-Q-wave myocardial infarction.**

1. Antman EM, McCabe C, Gurfinkel E, Turpie AGG, Bernink PJLM, Salein D, Bayes de Luna A, Fox K, Lablanche JM, Radley D, Premmereur J, Braunwald E, for the TIMI 11B Investigators. Enoxaparin prevents death in cardiac ischemia events in unstable angina/non-Q-wave myocardial infarction. Results of the Thrombolysis in Myocardial Infarction (TIMI 11B) Trial. *Circulation* 1999;100:1593-1601.
2. Antman EM. TIMI 11B. Enoxaparin versus unfractionated heparin for unstable angina or non-Q-wave myocardial infarction: a double-blind, placebo- controlled, parallel-group, multicenter trial. Rationale, study design, and methods. *Thrombolysis in Myocardial Infarction (TIMI) 11B Trial Investigators. Am Heart J* 1998;135:S353-60.
3. Antman EM, Cohen M, Radley D, McCabe C, Rush J, Premmereur J, Braunwald E, for the TIMI 11B and ESSENCE Investigators. Assessment of the treatment effect of enoxaparin for unstable angina/non-Q-wave myocardial infarction: TIMI 11B-ESSENCE meta-analysis. *Circulation* 1999;100:1602-1608.
4. Antman EM, Cohen M, Bernink PJLM, McCabe CH, Horacek T, Papuchis G, Mautner B, Corbalan R, Radley D, Braunwald E. The TIMI risk score for unstable angina/non-ST elevation MI: a method for prognostication and therapeutic decision making. *JAMA* 2000; 284: 835-842.
5. Bozovich G, Gurfinkel E, Antman EM, McCabe CH, Mautner B, for the TIMI 11B Investigators. Superiority of enoxaparin versus unfractionated heparin for unstable angina/non-Q-wave myocardial infarction regardless of activated partial thromboplastin time. *Am Heart J* 2000; 140: 637-642.
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8. Morrow DA, Rifai N, Tanasijevic M, Wybenga DR, de Lemos, JA, Antman EM. Clinical efficacy of three assays for cardiac troponin I for risk stratification in acute coronary syndromes: a thrombolysis in myocardial infarction (TIMI) 11B substudy. *Clinical Chemistry* 2000; 46: 453-460.
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10. Henry TD, Satran D, Knox LL, Iacarella CL, Laxson DD, Antman EM. Are activated clotting times helpful in the management of anticoagulation with subcutaneous low-molecular-weight heparin? *Am Heart J* 2001;142:590-3.
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12. Santopinto J, Gurfinkel EP, Torres V, Marcos E, Bozovich GE, Mautner B, McCabe CH, Antman EM. Prior aspirin users with acute non-ST-elevation coronary syndromes are at increased risk of cardiac events and benefit from enoxaparin. *Am Heart J* 2001; 141: 566-572.
13. Inverso SM, Cohen M, Antman EM, Spinler SA, for the ESSENCE and TIMI 11B Investigators. Safety and efficacy of unfractionated heparin (UH) versus enoxaparin(E) in obese patients and patients with renal impairment: analysis from ESSENCE and TIMI 11B studies. *J Am Coll Cardiol* 2001; 37(suppl A): 365A.
14. Antman EM, Cohen M, McCabe C, Goodman SG, Murphy SA, Braunwald E. Enoxaparin is superior to unfractionated heparin for preventing clinical events at 1-year follow-up of TIMI 11B and ESSENCE. *Eur Heart J* 2002;23:308-14.

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16. Cohen M, Antman EM, Murphy SA, Radley D. Mode and timing of treatment failure (recurrent ischemic events) after hospital admission for non-ST segment elevation acute coronary syndromes. *Am Heart J* 2002;143:63-9.
17. Cohen M, Antman EM. Superiority of enoxaparin over unfractionated heparin for the treatment of acute coronary syndromes. *Pharmacotherapy* 2002;22:542-6; discussion 546-50.
18. Fox KA, Antman EM, Cohen M, Bigonzi F. Comparison of enoxaparin versus unfractionated heparin in patients with unstable angina pectoris/non-ST-segment elevation acute myocardial infarction having subsequent percutaneous coronary intervention. *Am J Cardiol* 2002;90:477-82.
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22. Spinler SA, Inverso SM, Cohen M, Goodman SG, Stringer KA, Antman EM for the ESSENCE and TIMI 11B Investigators. Safety and efficacy of unfractionated heparin versus enoxaparin in patients who are obese and patients with severe renal impairment: Analysis from the ESSENCE and TIMI 11B studies. *American Heart Journal* 2003;146:33-41.
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## **TIMI 12**

**OBJECTIVE: To evaluate the safety and efficacy of the oral GP IIb/IIIa inhibitor sibrافiban for the treatment of patients with a recent acute coronary syndrome.**

1. Cannon CP, McCabe CH, Borzak S, Henry TD, Tischler MD, Mueller HS, Feldman R, Palmeri ST, Ault K, Hamilton SA, Rothman JM, Novotny WF, Braunwald E. Randomized trial of an oral platelet glycoprotein IIb/IIIa antagonist, sibrافiban, in patients after an acute coronary syndrome: results of the TIMI 12 trial. *Thrombolysis in Myocardial Infarction. Circulation* 1998;97:340-9.
2. Cannon CP, Bray PF, Ault KA, Rizzo MJ, Braunwald E. PIA2 polymorphism of the platelet IIb/IIIa receptor: increased risk of early recurrent ischemic events in acute coronary syndromes, increased platelet aggregability, and effective platelet inhibition by an oral IIb/IIIa inhibitor: results from TIMI 12. *Circulation* 1998;98(Suppl. I):I-171.
3. Ault KA, Cannon CP, Mitchell J, McCahan J, Tracy RP, Novotny WF, Reimann JD, Braunwald E. Platelet activation in patients after an acute coronary syndrome: results from the TIMI-12 trial. *Thrombolysis in Myocardial Infarction. J Am Coll Cardiol* 1999;33:634-9.

## **TIMI 14**

**OBJECTIVE: To evaluate the benefit of abciximab bolus plus 12 hour infusion alone or in conjunction with reduced dose thrombolytic therapy among patients presenting with ST elevation myocardial infarction.**

1. Antman EM, Giugliano RP, Gibson CM, McCabe CH, Coussement P, Kleiman NS, Vahanian A, Adgey AJJ, Rupprecht HJ, Van der Wieken R, Ducas J, Scherer J, Anderson K, Van de Werf F, Braunwald E, for the Thrombolysis in Myocardial Infarction (TIMI ) 14 Investigators. **Abciximab facilitates the rate and extent of thrombolysis: Results of TIMI 14 trial. Circulation 1999;99:2720-2732.**
2. Antman EM, Gibson CM, de Lemos JA, Giugliano RP, McCabe CH, Coussement P, Menown I, Mienaber CA, Rehders TC, Frey MJ, Van der Wieken R, Andresen D, Scherer J, Anderson K, Van de Werf F, Braunwald E, for the TIMI 14 Investigators. **Combination reperfusion therapy with abciximab and reduced dose reteplase: results from TIMI 14. Eur Heart J 2000; 21: 1944-53.**
3. de Lemos JA, Antman EM, Giugliano RP, Coulter SA, McCabe CH, Lambrew C, Ghali M, Gibson CM. **Non-culprit blood flow is an independent correlate of ECG injury patterns after thrombolytic therapy: a TIMI 14 substudy. Circulation 1998;98 (Suppl I):I-826.**
4. Giugliano RP, Antman EM, McCabe CH, Anderson KM, Adgey AA, Kleiman NS, Ghali M, Van de Werf F, Braunwald E. **Abciximab + tPA improves coronary flow in a wide range of subgroups: results from TIMI 14. Circulation 1998;98 (Suppl I):I-560.**
5. Giugliano RP, Antman EM, McCabe CH, Menown IBA, Kleiman NS, Ghali M, Coussement PK, Braunwald E. **Factors associated with major hemorrhage during reperfusion therapy in acute myocardial infarction: A TIMI 14 substudy. J Am Coll Cardiol 1999;33 (Suppl A):398A.**
6. Verheugt FWA, Ohman EM, Antman EM. **Emergency room infusion of abciximab speeds up reperfusion in acute myocardial infarction eligible for primary PTCA. J Am Coll Cardiol 1999;33 (Suppl A):354A.**
7. Gibson CM, Murphy S, Menown IB, Sequeira RF, Greene R, Van de Werf F, Schweiger MJ, Ghali M, Frey MJ, Ryan KA, Marble SJ, Giugliano RP, Antman EM, Cannon CP, Braunwald E. **Determinants of coronary blood flow after thrombolytic administration. TIMI Study Group. Thrombolysis in Myocardial Infarction. J Am Coll Cardiol 1999;34:1403-12.**
8. Gibson CM, Ryan KA, Murphy SA, Mesley R, Marble SJ, Giugliano RP, Cannon CP, Antman EM, Braunwald E. **Impaired coronary blood flow in nonculprit arteries in the setting of acute myocardial infarction. The TIMI Study Group. Thrombolysis in myocardial infarction. J Am Coll Cardiol 1999;34:974-82.**
9. Coulter SA, Cannon CP, Ault KA, Antman EM, Van de Werf F, Adgey AAH, Gibson CM, Giugliano RP, Maschelli MA, Scherer J, Barnathan ES, Braunwald E, Kleiman NS, for the TIMI 14 Platelet Substudy Investigators. **High levels of platelet inhibition with abciximab despite heightened platelet activation and aggregation during thrombolysis for acute myocardial infarction: results from TIMI (thrombolysis in myocardial infarction) 14. Circulation 2000;101:2690-2695.**
10. de Lemos JA, Antman EM, Giugliano RP, Morrow DA, McCabe CH, Charlesworth A, Schroeder R, Braunwald E. **Very early risk stratification after thrombolytic therapy with a bedside myoglobin assay and the 12-lead electrocardiogram. Am Heart J 2000; 140(3): 373-8.**
11. de Lemos JA, Antman EM, Morrow DA, Llevadot J, Giugliano RP, Coulter SA, Schuhwerk KC, Arslanian S, McCabe CH, Gibson CM, Rifai N. **Heart-type fatty acid binding protein as a marker of reperfusion after thrombolytic therapy. Clin Chim Acta 2000;298:85-97.**
12. de Lemos JA, Antman EM, Gibson CM, McCabe CH, Giugliano RP, Murphy SA, Coulter SA, Anderson K, Scherer J, Frey M, Van der Wieken R, Van de Werf F, Braunwald E for the TIMI 14 Investigators. **Abciximab improves both epicardial flow and myocardial reperfusion in ST-elevation myocardial infarction: observations from the TIMI 14 trial. Circulation 2000; 101: 239-43.**

13. de Lemos JA, Antman EM, Giugliano RP, McCabe CH, Murphy SA, Van de Werf F, Gibson CM, Braunwald E for the Thrombolysis in Myocardial Infarction (TIMI) 14 Investigators. Resolution of ST-segment elevation correlates with infarct related artery patency and flow after thrombolytic therapy. *Am J Cardiol* 2000; 85: 299-304.
14. Llevadot J, Giugliano RP, McCabe CH, Cannon CP, Antman EM, Murphy S, Gibson CM. Degree of residual stenosis in the culprit coronary artery after thrombolytic administration (thrombolysis in myocardial infarction (TIMI) trials). *Am J Cardiol* 2000; 85:1409-1413.
15. Gibson CM, Murphy SA, Marble SJ, Schuhwerk K, de Lemos JA. Adjunctive stenting is associated with the development of Q-waves in acute MI patients: a TIMI 14 substudy. *Circulation* 2000; 102(Suppl II): II-434.
16. Cooper HA, de Lemos JA, Morrow DA, Sabatine MS, Murphy SA, McCabe CH, Gibson CM, Antman EM. Single-lead ST-segment resolution to predict epicardial flow following fibrinolytic therapy: a useful bedside tool in acute myocardial infarction. *Circulation* 2001;104 (Suppl II):II-785.
17. Cooper HA, de Lemos JA, Murphy SA, McCabe CH, Schuhwerk KC, Antman EM, Braunwald E. Relation between time-to-pharmacologic reperfusion and the probability of achieving complete ST-segment resolution in ST elevation myocardial infarction. *J Am Coll Cardiol* 2001; 37 (Suppl.A): 339A.
18. Gibson CM, Murphy SA, Kraimer N, Pai R, Weisberg S, Marble SJ, Angeja BG, de Lemos J, Hollander JE, Weber J. Cocaine induced myocardial infarction is associated with reduced microvascular perfusion. *Circulation* 2001;104 (Suppl II):II-728.
19. Sutsch G, Gibson CM, Murphy SA, Amann FW. The impact of embolization protection on angiographic parameters in PCI with stenting in AMI. *Eur Heart J* 2001;22 (Abstr suppl):119.
20. de Lemos JA, Morrow DA, Gibson CM, Murphy SA, Rifai N, Tanasijevic M, Giugliano RP, Schuhwerk KC, McCabe CH, Cannon CP, Antman EM, Braunwald E. Early noninvasive detection of failed epicardial reperfusion after fibrinolytic therapy. *Am J Cardiol* 2001;88:353-8.
21. de Lemos JA, Gibson CM, Antman EM, Murphy SA, Morrow DA, Schuhwerk KC, Schweiger M, Coussement P, Van de Werf F, Braunwald E. Abciximab and early adjunctive percutaneous coronary intervention are associated with improved ST-segment resolution after thrombolysis: Observations from the TIMI 14 Trial. *Am Heart J* 2001;141:592-8.
22. Gibson CM, de Lemos JA, Murphy SA, Marble SJ, McCabe CH, Cannon CP, Antman EM, Braunwald E. Combination therapy with abciximab reduces angiographically evident thrombus in acute myocardial infarction: a TIMI 14 substudy. *Circulation* 2001;103:2550-4.
23. Gibson CM, Kirtane AJ, Murphy SA, Marble SJ, de Lemos JA, Antman EM, Braunwald E. Impact of contrast agent type (ionic versus nonionic) used for coronary angiography on angiographic, electrocardiographic, and clinical outcomes following thrombolytic administration in acute myocardial infarction. *Catheter Cardiovasc Interv* 2001;53:6-11.
24. Gibson CM, Murphy SA, Marble SJ, McCabe CH, Antman EM, Cannon CP, Braunwald E. Can we replace the 90-minute thrombolysis in myocardial infarction (TIMI) flow grades with those at 60 minutes as a primary end point in thrombolytic trials? TIMI Study Group. *Am J Cardiol* 2001;87:450-3,A6.
25. Giri S, Gibson CM, Eisenhauer A, Kuntz R, Rogers C, Murphy S, Mitchel J, Antman EM, Simon DI. Aging of intracoronary thrombus due to delayed time-to-reperfusion increases ischemic and angiographic complications in acute myocardial infarction. *J Am Coll Cardiol* 2002;39 (Suppl A):281A.
26. Marks DS, Gudapati SB, Kleczka JF, Murphy S, Cannon CP, Braunwald E. Electrocardiographic left ventricular hypertrophy is associated with mortality and left ventricular rupture in patients with acute myocardial infarction. *J Am Coll Cardiol* 2002;39 (Suppl A):331A.
27. Murphy SA, Giugliano RP, Wong GC, Cannon CP, Antman EM, Gibson CM. Comparison of the frequency and outcomes of investigator assessed recurrent MI versus clinical event committee (CEC) adjudicated recurrent MI in acute MI trials: A TIMI 14 and TIMI 9 substudy. *J Am Coll Cardiol* 2002;39 (Suppl A):279A.
28. Angeja BG, de Lemos J, Murphy SA, Marble SJ, Antman EM, Cannon CP, Braunwald E, Gibson CM. Impact of diabetes mellitus on epicardial and microvascular flow after fibrinolytic therapy. *Am Heart J* 2002;144:649-56.
29. Angeja BG, Kermgard S, Chen MS, McKay M, Murphy SA, Antman EM, Cannon CP, Braunwald E, Gibson CM. The Smoker's Paradox: Insights from the Angiographic Substudies of the TIMI Trials. *J Thromb Thrombolysis* 2002;13:133-9.

30. Antman EM, Cooper HA, Gibson CM, de Lemos JA, McCabe CH, Giugliano RP, Coussement P, Murphy S, Scherer J, Anderson K, Van de Werf, and Braunwald E, for the Thrombolysis in Myocardial Infarction (TIMI) 14 Investigators. Determinants of improvement in epicardial flow and myocardial perfusion for ST elevation myocardial infarction: Insights from TIMI 14 and InTIME II. *Eur Heart J* 2002; 23:928-33.
31. Cooper HA, deLemos JA, Morrow DA, Sabatine MS, Murphy SA, McCabe CH, Gibson CM, Antman EM, Braunwald E. Minimal ST-segment deviation: A simple, noninvasive method for identifying patients with a patent infarction-related artery after fibrinolytic administration. *Am Heart J* 2002;144:790-795.
32. Antman EM, Cooper HA, Gibson CM, de Lemos JA, McCabe CH, Giugliano RP, Coussement P, Murphy S, Scherer J, Anderson K, Van de Werf F, Braunwald E for the Thrombolysis in Myocardial Infarction (TIMI) 14 Investigators. Determinants of improvement in epicardial flow and myocardial perfusion for ST elevation myocardial infarction: Insights from TIMI 14 and InTIME-II. *Eur Heart J* 2002;23:928-933.
33. Murphy SA, Dauterman K, de Lemos JA, Kermgard S, Antman EM, Braunwald E, and Gibson CM for the Thrombolysis in Myocardial Infarction (TIMI) 14 Investigators. Angiographic and clinical characteristics associated with the development of Q-wave and non-Q-wave MI in the Thrombolysis In Myocardial Infarction (TIMI) 14 trial. *Am Heart J* 2003;146:42-47.
34. Shimp M, Morrow DA, Weinberg EO, Sabatine MS, Murphy SA, Antman EM, Lee RT. Serum levels of the interleukin-1 receptor family member ST2 predict mortality and clinical outcome in acute myocardial infarction. *Circulation* 2004;109:186-190.

### **TIMI 15A**

**OBJECTIVE:** To evaluate the pharmacodynamic response, safety and pharmacokinetics of various doses of the GP IIb/IIIa inhibitor RPR 109891 given intravenously for the treatment of patients with acute coronary syndromes.

### **TIMI 15B**

**OBJECTIVE:** To evaluate the pharmacodynamic response, safety and pharmacokinetics of the GP IIb/IIIa inhibitor RPR 109891 given intravenously followed by oral administration for the treatment of patients with acute coronary syndromes.

1. Giugliano RP, McCabe CH, Sequeria RF, Frey MJ, Henry TD, Piana RN, Tamby JF, Jensen BK, Nicolas SB, Jennings LK, Wise RJ, Braunwald E for the TIMI 15A and 15B Investigators. First report of an intravenous and oral GP IIb/IIIa inhibitor (RPR 109891) in patients with recent acute coronary syndromes: results of the TIMI 15a and 15b trials. *Am Heart J* 2000; 140: 81-93.

### **OPUS-TIMI 16**

**OBJECTIVE:** To determine if an oral GP IIb/IIIa inhibitor, orbofiban, reduces major cardiovascular events for the treatment of patients with an unstable coronary syndrome within 72 hours.

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### **InTIME II-TIMI 17**

**OBJECTIVE: To compare the single-bolus fibrinolytic agent lanoteplase (nPA) with accelerated rtPA for the treatment of patients with ST elevation myocardial infarction.**

1. **The InTIME-II Investigators. Intravenous nPA for the treatment of infarcting myocardial early: InTIME-II, a double blind comparison of single bolus lanoteplase vs. accelerated alteplase for the treatment of patients with acute myocardial infarction. *Eur Heart J*. 2000; 21: 2005-2013.**
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### **TACTICS-TIMI 18**

**OBJECTIVE: To compare invasive vs. conservative strategies among patients presenting with unstable angina and non-Q-wave myocardial infarction following treatment with the glycoprotein IIb/IIIa inhibitor tirofiban.**

1. Cannon CP, Weintraub WS, Demopoulos LA, Robertson DH, Gormley GJ, Braunwald E. Invasive versus conservative strategies in unstable angina and non-Q-wave myocardial infarction following treatment with tirofiban: rationale and study design of the international TACTICS-TIMI 18 Trial. *Treat angina with aggrastat and determine cost of therapy with an invasive or conservative strategy. Thrombolysis In Myocardial Infarction. Am J Cardiol.* 1998;82:731-6.
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### **ER-TIMI 19**

**OBJECTIVE: To evaluate the safety and feasibility of prehospital fibrinolysis with reteplase for the treatment of patients with ST elevation myocardial infarction.**

1. Morrow DA, Antman EM, Sayah A, Schuhwerk KC, Giugliano RP, deLemos JA, Waller M, Cohen SA, Rosenberg DG, Cutler SS, McCabe CH, Walls RM, Braunwald E. Evaluation of the time saved by prehospital initiation of reteplase for ST-elevation myocardial infarction: results of The Early Retavase-Thrombolysis in Myocardial Infarction (ER-TIMI) 19 trial. *J Am Coll Cardiol*. 2002;40:71-7.

### **INTEGRITI-TIMI 20**

**OBJECTIVE: To evaluate the safety and efficacy of the combination of eptifibatide and TNK among patients presenting with ST elevation myocardial infarction.**

1. Giugliano RP, Roe MT, Harrington RA, Gibson CM, Zeymer U, Van de Werf F, Baran KW, Hobbach H-P, Woodlief LH, Hannan KL, Greenberg S, Miller J, Kitt MM, Strony J, McCabe CH, Braunwald E, Califf RM, on behalf of the INTEGRITI Investigators. Combination reperfusion therapy with eptifibatide and reduced-dose tenecteplase for ST-elevation myocardial infarction: Results of the Integrilin and tenecteplase in acute myocardial infarction (INTEGRITI) Phase II Angiographic Trial. *J Am Coll Cardiol* 2003;41:1251-1260.
2. Roe MT, Giugliano RP, Harrington RA, Gibson CM, Strony J, Kitt MM, et al. Giugliano RP, Roe MT, Zeymer U, Gibson CM, Fox NL, Greenberg S, Kitt MM, Strony JT, Braunwald E. Combination reperfusion therapy for acute myocardial infarction with eptifibatide and tenecteplase: design and methodology of the (integrilin tenecteplase for acute myocardial infarction) INTEGRITI trial. *Heart Drug*. 2001; 1: 5-13.

3. Zeymer U, Van de Werf F, Giugliano RP, Roe MT, Kitt M, Strony JT, Harrington RA, Braunwald E. Effects of facilitated percutaneous coronary intervention on myocardial perfusion and clinical outcome in patients treated with tenecteplase and eptifibatide for acute myocardial infarction. *Eur Heart J*. 2002;23 (Suppl):255.
4. Gibson CM, Murphy SA, Marble SJ, James D, Kalapanda R, Zeymer U, Kassel K, Giugliano RP. Combination therapy with eptifibatide and TNK is associated with an improved rate of dye entry into the myocardium (TIMI myocardial frame count) in ST elevation myocardial infarction (STEMI): An INTEGRITI substudy. *Circulation*, 2002; 106(19):II-363.
5. Gibson CM, Murphy SA, James D, Marble SJ, Wong GC, Kalapanda R, Kraimer N, Antman EM. Facilitated angioplasty is associated with an improvement in the number of frames required for dye to fill the myocardium (TIMI myocardial frame count) in ST segment elevation myocardial infarction (STEMI). *Circulation* 2002; 106(19):II-598.
6. Gibson CM, Giugliano RP, Roe MT, Murphy SA, Green CL, Sabatine MS, Morrow DA, Schweiger MJ, Miklin JS, Krucoff M. Impaired TIMI epicardial flow and myocardial perfusion grades are associated with increased time to ST segment recovery in ST segment elevation MI: An INTEGRITI substudy. *Circulation* 2002; 106(19):II-598.
7. Rebeiz AG, Green CL, Johanson P, Giugliano RP, Harrington RA, Moliterno DJ, Roe MT, Newby LK, Crater SW, Langer A, Krucoff MW. ST-Segment Recovery with Combination Versus Stand-Alone Thrombolytic Therapy in ST-Segment Elevation Myocardial Infarction is Time-Dependent: Pooled Data from PARADIGM, IMPACT-AMI, GUSTO-V, INTEGRITI. *Circulation* 2003;108(Suppl IV):378.
8. Gibson CM, Jennings LK, Murphy SA, Lorenz DP, Giugliano RP, Harrington RA, Cholera S, Krishnan R, Califf RM, Braunwald E for the INTEGRITI Study Group. Association between platelet receptor occupancy following eptifibatide (integrilin) therapy with patency, myocardial perfusion and ST segment resolution among patients with ST segment elevation myocardial infarction: An INTEGRITI substudy. *Circulation* 2004;110:679-84.
4. Gibson CM, Karha J, Giugliano RP, Roe MT, Murphy SA, Harrington RA, Green CL, Schweiger MJ, Miklin JS, Baran KW, Palmeri S, Braunwald E, Krucoff MD for the INTEGRITI Study Group. Association of the timing of ST-segment resolution with TIMI Myocardial perfusion grade in acute myocardial infarction. *Am Heart J* 2004;147:847-852.
5. Roe MT, Green CL, Giugliano RP, Gibson CM, Baran K, Greenberg M, Palmeri ST, Crater S, Trollinger K, Hannan K, Harrington RA, Krucoff MW; INTEGRITI Investigators. Improved speed and stability of ST-segment recovery with reduced-dose tenecteplase and eptifibatide compared with full-dose tenecteplase for acute st-segment elevation myocardial infarction. *J Am Coll Cardiol*. 2004;43(4):549-56.

### **A to Z-TIMI 21**

#### **OBJECTIVES:**

**To determine if early aggressive treatment with simvastatin compared to standard therapy reduces major cardiac events at 1 year in high-risk acute coronary syndrome patients.**

**To determine the safety and efficacy of enoxaparin compared to unfractionated heparin when given to patients with acute coronary syndromes also receiving the GP IIb/IIIa inhibitor tirofiban.**

1. Blazing MA, de Lemos JA, Dyke C, Califf R, Braunwald E, Billheimer D. The A-to-Z trial: methods and rationale for a single trial that investigates the combined use of low-molecular weight heparin with GP IIB/IIIA inhibitor tirofiban and determines the efficacy of early aggressive simvastatin therapy. *Am Heart J* 2001; 142: 211-7.

2. **Blazing MA, deLemos JA, White HD, Fox KAA, DiBattiste PM, Califf RM, Braunwald E for the A to Z investigators. Safety and efficacy of enoxaparin vs unfractionated heparin in patients with non-ST-segment elevation acute coronary syndromes who receive tirofiban and aspirin. Randomized controlled trial. JAMA 2004;292:55-64.**
3. **de Lemos JA, Blazing MA, Wiviott SD, Lewis EF, Fox KAA, White HD, Rouleau J, Pedersen TR, Gardner LH, Mukherjee R, Ramsey KE, Palmisano J, Bilheimer DW, Pfeffer MA, Califf RM, Braunwald E for the A to Z Investigators. Early Intensive vs a Delayed Conservative Simvastatin Strategy in Patients With Acute Coronary Syndromes - Phase Z of the A to Z Trial. JAMA 2004;292:1307-1316.**
4. de Lemos JA, Blazing MA, Wiviott SD, Brady WE, White HD, Fox KAA, Palmisano J, Ramsey KE, Bilheimer DW, Lewis EF, Pfeffer M, Califf RM, Braunwald E for the A to Z Investigators. Enoxaparin versus unfractionated heparin in patients treated with tirofiban, aspirin and an early conservative initial management strategy: results from the A phase of the A-to-Z trial. Eur Heart J 2004;25:1688-94.
5. Morrow DA, de Lemos JA, Blazing MA, Sabatine MS, Murphy SA, Jarolim P, White HD, Fox KA, Califf RM, Braunwald E for the A to Z investigators. Prognostic value of serial B-type natriuretic peptide during follow-up of patients with unstable coronary artery disease. JAMA 2005;294:2866-71.
6. Morrow DM, de Lemos JA, Sabatine MS, Wiviott SD, Blazing MA, Shui A, Rifai N, Califf RM, Braunwald E. Clinical relevance of C-reactive protein during follow-up of patients with acute coronary syndromes in the Aggrastat-to-Zocor Trial. Circulation 2006;114:281-8.
7. de Lemos JA, Morrow DA, Blazing MA, Jarolim P, Wiviott SD, Sabatine MS, Califf RM, Braunwald E. Serial measurement of monocyte chemoattractant protein-1 after acute coronary syndromes: Results from the A to Z trial. J Am Coll Cardiol 2007;50:2117-24.

## **PROVE IT-TIMI 22**

**OBJECTIVE: To compare the efficacy of atorvastatin vs. pravastatin and the clinical efficacy of the antibiotic gatifloxacin vs. placebo in a 2 x 2 factorial design among patients presenting with unstable angina or non-Q-wave myocardial infarction.**

1. **Cannon CP, McCabe CH, Belder R, Breen J, Braunwald E. Design of the Pravastatin or Atorvastatin Evaluation and Infection Therapy (PROVE IT)-TIMI 22 trial. Am J Cardiol. 2002;89:860-1.**
2. **Cannon CP, Braunwald E, McCabe CH, Rader DJ, Rouleau JL, Belder R, Joyal SV, Hill KA, Pfeffer MA, Skene AM. Intensive versus moderate lipid lowering with statins after acute coronary syndromes. N Engl J Med 2004;350:1495-1504.**
3. **Cannon CP, Braunwald E, McCabe CH, Grayston JT, Muhlstein B, Giugliano RP, Cairns R, Skene AM for the Pravastatin or Atorvastatin Evaluation and Infection Therapy – Thrombolysis in Myocardial Infarction (PROVE IT - TIMI) 22 Investigators. Antibiotic treatment of *Chlamydia pneumoniae* following acute coronary syndrome. N Engl J Med 2005;352:1646-54.**
4. Giugliano RP, Cannon CP, Rader D, Grundy SM, McCabe CH, Braunwald E. Graded benefit of atorvastatin over pravastatin dependent upon baseline LDL. Circulation 2004;110:III-696.
5. Gibson CM, Sabatine MS, Murphy SA, Morrow DA, Wiviott SD, Smith S, McCabe CH, Cannon CP, Braunwald E. Association of intensive lipid lowering with reductions in target vessel revascularization (clinical restenosis) and non-target vessel revascularization (lesion progression): a PROVE-IT TIMI 22 substudy. Circulation 2004;110:III-696.
6. Sabatine MS, Wiviott SD, Morrow DA, McCabe CH, Cannon CP. High-dose atorvastatin associated with worse glycemic control: a PROVE-IT TIMI 22 substudy. Circulation 2004;110,(Suppl III):III-834.
7. Sabatine MS, Morrow DA, McCabe CH, Smith S, Meredith I, de Ferrari G, Gibson CM. Does intensive statin therapy reduce both urgent and elective coronary revascularization? Results from PROVE-IT TIMI 22. Circulation 2004;110,(Suppl III):III-696.

8. Wiviott SD, Cannon CP, Ray KK, Murphy SA, Darius H, Castaigne A, Velasco JA, McCabe CH, Gibson CM. Seasonal variations in lipid values in patients following acute coronary syndrome: PROVE IT-TIMI 22. *J Am Coll Cardiol* 2005; 45(3 Suppl A):394A.
9. Ray KK, Morrow DA, Murphy SA, McCabe CH, Gibson CM, Cannon CP. Baseline urinary albumin concentration predicts long-term cardiovascular risk in acute coronary syndrome patients: A PROVE IT-TIMI 22 substudy. *J Am Coll Cardiol* 2005; 45(3 Suppl A):195A.
10. Rose E, McCabe C, Cairns R, Cannon CP, Braunwald E. Dramatic benefit of intensive statin therapy in women: Results from PROVE IT – TIMI 22. *J Am Coll Cardiol* 2005;45:12A.
11. Ray KK, Cannon CP, Morrow DA, Cairns R, Braunwald E. Percutaneous coronary intervention for ACS is associated with a long-term reduction in CRP: An analysis from PROVE IT – TIMI 22. *Eur Heart J* 2005;26(abstr):39.
12. Ray KK, Cannon CP, Rader DJ, Cairns R, McCabe CH, Sacks FM, Braunwald E. Baseline ApoB predicts benefit of intensive statin therapy in patients with ACS: An analysis from PROVE IT-TIMI 22. *Eur Heart J* 2005;26(abstr):553.
13. Ahmed S, Cannon CP, McCabe CH, Murphy SA, Braunwald E. Acute coronary syndromes and diabetes mellitus: Does intensive lipid lowering work? *Eur Heart J* 2005;26(abstr):666.
14. Ray KK, Cannon CP, Morrow DA, Cairns R, McCabe CH, Ridker PM, Braunwald E. CRP is additive and independent of Apo B/A1 ratio in explaining the clinical benefits of atorvastatin 80 mg in ACS patients in PROVE IT – TIMI 22. *Circulation* 2005;112:II:483.
15. Wiviott SD, Cannon CP, Morrow DA, Ray KK, Pfeffer MA, Braunwald E. Can low-density lipoprotein be too low? The safety and efficacy of achieving very low low-density lipoprotein with intensive statin therapy: A PROVE IT-TIMI 22 Substudy. *J Am Coll Cardiol*. 2005;46(8):1411-6.
16. Ray KK, Cannon CP, Cairns R, Morrow DA, Rifai N, Kirtane AJ, McCabe CH, Skene AM, Gibson CM, Ridker PM, Braunwald E. Relationship between uncontrolled risk factors and C-reactive protein levels in patients receiving standard or intensive statin therapy for acute coronary syndromes in the PROVE IT-TIMI 22 Trial. *J Am Coll Cardiol*. 2005;46(8):1417-24.
17. Wiviott SD, Cannon CP, Morrow DA, Ray KK, Pfeffer MA, Braunwald E. Can low-density lipoprotein be too low? The safety and efficacy of achieving very low low-density lipoprotein with intensive statin therapy: A PROVE IT – TIMI 22 substudy. *J Am Coll Cardiol* 2005;46:1411-6.
18. Ray KK, Cannon CP, McCabe CH, Cairns R, Tonkin AM, Sacks FM, Jackson G, Braunwald E for the PROVE IT-TIMI 22 Investigators. Early and late benefits of high-dose atorvastatin in patients with acute coronary syndromes. Results from the PROVE IT – TIMI 22 trial. *J Am Coll Cardiol* 2005;46:1405-10.
19. Ridker PM, Cannon CP, Morrow D, Rifai N, Rose LM, McCabe CH, Pfeffer MA, Braunwald E. C-reactive protein levels and outcomes after statin therapy. *N Engl J Med* 2005;352:20-8.
20. Ridker PM, Morrow D, Rose LM, Cannon CP, Braunwald E. Relative efficacy of atorvastatin 80 mg and pravastatin 40 mg in achieving the dual goals of low-density lipoprotein cholesterol <70 mg/dl and CRP < 2 mg/l: An analysis of the PROVE-IT TIMI 22 trial. *J Am Coll Cardiol* 2005;45:1644-8.
21. Ray KK, Cannon CP, Cairns R, Morrow DA, Rifai N, Kirtane AJ, McCabe CH, Skene AM, Gibson CM, Ridker PM, Braunwald E for the PROVE IT – TIMI 22 Investigators. Relationship between uncontrolled risk factors and c-reactive protein levels in patients receiving standard or intensive statin therapy for acute coronary syndromes in the PROVE IT - TIMI 22 trial. *J Am Coll Cardiol* 2005;46:1417-24.
22. Mega JL, Morrow DA, Cannon CP, Murphy S, Cairns R, Ridker PM, Braunwald E. Cholesterol, c-reactive protein, and cerebrovascular events following intensive and moderate statin therapy. *J Thromb Thrombolysis* 2006;22:71-6.
23. Ray KK, Bach RG, Cannon CP, Cairns R, Kirtane AJ, Wiviott SD, McCabe CH, Braunwald E, Gibson CM. Benefits of achieving the NCEP optional LDL-C goal among elderly patients with ACS. *Eur Heart J* 2006;27:2310-6.
24. O'Donoghue, M, Morrow DA, Sabatine MS, Murphy SA, McCabe CH, Cannon CP, Braunwald E. Lipoprotein-associated phospholipase A<sub>2</sub> and its association with cardiovascular outcomes in patients with acute coronary syndromes in the PROVE IT-TIMI 22 trial. *Circulation* 2006;113:1745-52.
25. Scirica BM, Morrow DA, Cannon CP, Ray KK, Sabatine MS, Jarolim P, Shui A, McCabe CH, Braunwald E for the PROVE IT-TIMI 22 investigators. Intensive statin therapy and the risk of hospitalization for heart failure after an acute coronary syndrome in the PROVE IT –TIMI 22 study. *J Am Coll Cardiol* 2006;47:2326-31.
26. Bonaca MP, Morrow DA, Sabatine MS, Kausik KR, Rifai N, Cannon CP. Elevated Levels of Placental Growth Factor (PIGF) and Long Term Risk in Patients in Acute Coronary Syndromes in PROVE IT-TIMI

27. Schweiger MJ, Giugliano RP, Lotfi A, Murphy SA, Cannon CP. High dose atorvastatin does not impact the efficacy of clopidogrel - A PROVE IT TIMI-22 analysis. *J Am Coll Cardiol* 2006;47(4):380A.
28. Ahmed S, Cannon CP, Murphy SA, Braunwald E. Acute coronary syndromes and diabetes: is intensive lipid lowering beneficial? Results of the PROVE IT-TIMI 22 Trial. *Eur Heart J*. 2006;27:2323-9.
29. Ray KK, Morrow DA, Sabatine MS, Shui A, Rifai N, Cannon CP, Braunwald E. Long-term prognostic value of neopterin: a novel marker of monocyte activation in patients with acute coronary syndrome. *Circulation*. 2007;115(24):3071-8.
30. Miller M, Cannon CP, Murphy SA, Qin J, Ray KK, Braunwald E. Impact of triglyceride levels beyond low-density lipoprotein cholesterol after acute coronary syndrome in the PROVE IT-TIMI 22 trial. *J Am Coll Cardiol*. 2008;51:724-30.
31. Lotfi A, Schweiger MJ, Giugliano GR, Murphy SA, Cannon CP. High-dose atorvastatin does not negatively influence clinical outcomes among clopidogrel treated acute coronary syndrome patients--a Pravastatin or Atorvastatin Evaluation and Infection Therapy-Thrombolysis in Myocardial Infarction 22 (PROVE IT-TIMI 22) analysis. *Am Heart J*. 2008;155:954-8.
32. Morrow DA, Wang Y, Croce K, Sakuma M, Sabatine MS, Gao H, Pradhan AD, Healy AM, Buros J, McCabe CH, Libby P, Cannon CP, Braunwald E, Simon DI. Myeloid-related protein 8/14 and the risk of cardiovascular death or myocardial infarction after an acute coronary syndrome in the Pravastatin or Atorvastatin Evaluation and Infection Therapy (PROVE IT – TIMI 22) trial. *Am Heart J* 2008;155:49-55.
33. Iakoubova OA, Sabatine MS, Rowland CM, Tong CH, Catanese JJ, Ranade K, Simonsen KL, Kirchgessner TG, Cannon CP, Devlin JJ, Braunwald E. Polymorphism in K1F6 gene and benefit from statins after acute coronary syndromes: Results from the PROVE IT - TIMI 22 study. *J Am Coll Cardiol* 2008;251:449-55.
34. Giraldez RR, Giugliano RP, Mohanavelu S, Murphy SA, McCabe CH, Cannon CP, Braunwald E. Baseline low-density lipoprotein cholesterol is an important predictor of the benefit of intensive lipid-lowering therapy: a PROVE IT-TIMI 22 (Pravastatin or Atorvastatin Evaluation and Infection Therapy-Thrombolysis In Myocardial Infarction 22) analysis. *J Am Coll Cardiol* 2008;52:914-20.

### **ENTIRE-TIMI 23**

**OBJECTIVE: To assess the safety and efficacy of enoxaparin as an adjunct to thrombolysis with or without GP IIb/IIIa therapy among patients presenting with ST elevation myocardial infarction.**

1. Antman EM, Louwerenburg HW, Baars HF, Wesdorp JC, Hamer B, Bassand JP, Bigonzi F, Pisapia G, Gibson CM, Heidbuchel H, Braunwald E, Van de Werf F. Enoxaparin as adjunctive antithrombin therapy for ST-elevation myocardial infarction: results of the ENTIRE-Thrombolysis in Myocardial Infarction (TIMI) 23 Trial. *Circulation*. 2002;105:1642-9.
2. Morrow DA, Rifai N, Bassand JP, Bigonzi F, Pisaipia G, Van de Werf F, Antman EM. Enoxaparin attenuates the rise in von willebrand factor after fibrinolysis for ST-elevation myocardial infarction: Results from ENTIRE-TIMI 23. *Eur Heart J* 2002; Supp I.
3. Morrow DA, Rifai N, Bigonzi F, Bassand JP, Pisaipia G, Hecquet C, Van de Werf F, Antman EM. Enoxaparin attenuates the rise in Von Willebrand factor in patients with ST-segment elevation myocardial infarction treated with fibrinolysis: results from ENTIRE-TIMI 23. *Eur Heart J*. 2002;23 (Abstr suppl):506.
4. Mega JL, Morrow DA, de Lemos JA, Sabatine MS, Murphy SA, Rifai N, Gibson CM, Antman EM, Braunwald E. B-type natriuretic peptide at presentation and prognosis in patients with ST-segment elevation myocardial infarction: An ENTIRE-TIMI 23 substudy. *J Am Coll Cardiol* 2004;44:335-9.
5. Gibson CM, Jennings LK, Lorenz D, Giugliano RP, Harrington RA, Roe MT, Murphy SA, Cholera S, Baran KW, Hobbach H, Braunwald E. Increased platelet receptor occupancy following eptifibatid therapy is associated with improved patency, tissue level perfusion and ST segment resolution in ST segment elevation myocardial infarction: An INTEGRITI substudy. *Circulation* 2004;110(6):679-84

6. Gibson CM, Murphy SA, Morrow DA, Aroesty JM, Gibbons RJ, Gourlay SG, Barron HV, Giugliano RP, Antman EM, Braunwald E. Angiographic Perfusion Score: An Angiographic Variable That Integrates Both Epicardial and Tissue Level Perfusion Before and After Facilitated Percutaneous Coronary Intervention in Acute Myocardial Infarction. *American Heart Journal* 2004;148(2):336-40.
7. Shimp M, Morrow DA, Weinberg EO, Sabatine MS, Murphy SA, Antman EM, Lee RT. Serum levels of the interleukin-1 receptor family member ST2 predict mortality and clinical outcome in acute myocardial infarction. *Circulation* 2004;109:186-190.
8. Gelfand EV, Morrow DA, Sabatine MS, Rifai N, Murphy SA, McCabe CH, Antman EM. Risk Stratification in STEMI with multiple biomarkers. *J Am Coll Cardiol* 2004;44(5):259A.
9. Ray KK, Morrow D, Murphy S, McCabe C, Antman E, Braunwald E, Gibson CM. Changes in soluble markers of endothelial function correlate with TIMI flow grade and corrected TIMI frame count after fibrinolysis. An ENTIRE-TIMI 23 substudy. *Circulation* 2004;110:III-660.
10. Ray KK, Morrow D, Gibson CM, Murphy S, Antman EM, Braunwald E for the ENTIRE-TIMI 23 Study Group. Predictors of the rise in vWF after ST elevation myocardial infarction: Implications for treatment strategies and clinical outcome. *Eur Heart J* 2005;26:440-446.

### **FASTER-TIMI 24**

**OBJECTIVE: To evaluate the efficacy and safety of reduced dose TNK-tPA in combination with tirofiban bolus and infusion compared to a control group of full dose TNK-tPA.**

1. Ohman EM, Van de Werf F, Antman EM, Califf RM, deLemos JA, Gibson CM, Oliverio RL, Harrelson L, McCabe C, DiBattiste P, Braunwald E for the FASTER (TIMI 24) Investigators: Tenecteplase and tirofiban in ST-segment elevation acute myocardial infarction: results of a randomized trial. *Am Heart J* 2005;150:79-88.

### **EXTRACT-TIMI 25**

**OBJECTIVE: To evaluate the efficacy and safety of enoxaparin throughout the index hospitalization or unfractionated heparin for at least 48 hours in patients with ST-elevation myocardial infarction scheduled to undergo fibrinolysis.**

1. Antman EM, Morrow DA, McCabe CH, Jiang F, White HD, Fox KAA, Sharma D, Chew P, Braunwald E. Enoxaparin versus unfractionated heparin as antithrombin therapy in patients receiving fibrinolysis for ST-elevation myocardial infarction: Design and rationale for the Enoxaparin and Thrombolysis Reperfusion for Acute Myocardial Infarction Treatment-Thrombolysis in Myocardial Infarction Study 25 (ExTRACT – TIMI 25). *Am Heart J* 2005;149:217-26.
2. Antman EM, Morrow DA, McCabe CH, Murphy SA, Ruda M, Sadowski Z, Budaj A, Lopez-Sendon JL, Guneri S, Jiang F, White HD, Fox KAA, Braunwald E for the ExTRACT-TIMI 25 Investigators. Enoxaparin versus unfractionated heparin with fibrinolysis for ST-elevation myocardial infarction. *N Engl J Med* 2006;354:1477-88.
3. Morrow DA, Wiviott SD, Sabatine MS, Giugliano RP, McCabe CH, Antman EM, Braunwald E. Evaluation of the TIMI risk index in a multi-continental population of 19,103 patients with STEMI in the ExTRACT-TIMI 25 trial. *J Am Coll Cardiol* 2006;47:223A.
4. White HD, Braunwald E, Murphy S, Jacob AJ, Gotcheva N, Polonetsky L, Antman EM. Enoxaparin vs. unfractionated heparin with fibrinolysis for ST-elevation myocardial infarction in elderly and younger patients: results from ExTRACT-TIMI 25. *Eur Heart J* 2007;28:1066-1071.
5. Sabatine MS, Morrow DA, Dalby A, Pfisterer M, Duris T, Lopez-Sendon J, Murphy SA, Gao R, Antman EM, Braunwald E. Efficacy and safety of enoxaparin vs. unfractionated heparin in patients with ST-segment elevation myocardial infarction also treated with clopidogrel. *J Am Coll Cardiol* 2007;49:2256-

6. Fox KAA, Antman EM, Montalescot G, Agewall S, SomaRaju B, Verheugt FWA, Lopez-Sendon J, Hod H, Murphy SA, Braunwald E. The impact of renal dysfunction on outcomes in the ExTRACT-TIMI 25 study. *J Am Coll Cardiol* 2007;49:2249-2255.
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8. Gibson CM, Murphy SA, Montalescot G, Morrow DA, Ardissino D, Cohen M, Gulba DC, Kracoff OH, Lewis BS, Roguin, Antman EM, Braunwald E. Percutaneous coronary intervention in patients receiving enoxaparin or unfractionated heparin following fibrinolytic therapy for ST-elevation myocardial infarction in the ExTRACT-TIMI 25 trial. *J Am Coll Cardiol* 2007;49:2238-2246.
9. Giraldez RR, Nicolau JC, Corbalan R, Gurfinkel EP, Juarez U, Lopez-Sendon J, Parkhomenko A, Molhoek P, Mohanavelu S, Morrow DA, Antman EM. Enoxaparin is superior to unfractionated heparin in patients with ST elevation myocardial infarction undergoing fibrinolysis regardless of the choice of lytic: an ExTRACT-TIMI 25 analysis. *Eur Heart J* 2007;28:1566-1573.
10. Steinberg BA, Moghbeli N, Buros J, Ruda M, Parkhomenko A, Soma Raju B, Garcia-Castillo A, Janion M, Nicolau JC, Fox KAA, Morrow DA, Gibson CM, Antman EM. Global outcomes of ST-elevation myocardial infarction: comparisons of the Enoxaparin and Thrombolysis Reperfusion for Acute Myocardial Infarction Treatment-Thrombolysis In Myocardial Infarction study 25 (ExTRACT-TIMI 25) registry and trial. *Am Heart J* 2007;154:54-61.
11. Scirica BM, Morrow DA, Sadowski Z, ruda M, Nicolau JC, Giugliano RP, Wiviott SD, Sabatine MS, Shui A, Antman EM, Braunwald E. A strategy of using enoxaparin as adjunctive antithrombin therapy reduces death and recurrent myocardial infarction in patients who achieve early ST-segment resolution after fibrinolytic therapy: the ExTRACT-TIMI 25 ECG study. *Eur Heart J* 2007;28:2070-2076.
12. Ruff CT, Wiviott SD, Morrow DA, Mohanavelu S, Murphy SA, Antman EM, Braunwald E. ExTRACT-TIMI 25 Investigators. TIMI risk index and the benefit of enoxaparin in patients with ST-elevation myocardial infarction. *Am J Med* 2007;120:993-8.
13. Morrow DA, Antman EM, Murphy SA, Qin J, Ruda M, Guneri S, Jacob AJ, Budaj A, Braunwald E. Effect of enoxaparin versus unfractionated heparin in diabetic patients with ST-elevation myocardial infarction in the Enoxaparin and Thrombolysis Reperfusion for Acute Myocardial Infarction Treatment – Thrombolysis In Myocardial Infarction study 25 (ExTRACT-TIMI 25) Study. *Am Heart J* 2007;154:1078-1084.
14. Gibson CM, Pride YB, Aylward PE, Col JJ, Goodman SG, Gulba D, Bergovec M, Kunadian V, Zorkun C, Buros JL, Murphy SA, Antman EM. Association of non-steroidal anti-inflammatory drugs with outcomes in patients with ST-segment elevation myocardial infarction treated with fibrinolytic therapy: an ExTRACT-TIMI 25 analysis. *J Thromb Thrombolysis*: in press.

## **JUMBO-TIMI 26**

**OBJECTIVE: To evaluate the efficacy and safety of prasugrel, a novel thienopyridine, compared to clopidogrel in patients undergoing PCI**

1. Wiviott SD, Antman EM, Winters KJ, Weerakkody G, Murphy SA, Behounek BD, Carney RJ, Lazzam C, McKay RG, McCabe CH, Braunwald E for the JUMBO – TIMI 26 investigators. Randomized comparison of prasugrel (CS-747, LY640315), a novel thienopyridine P2Y<sub>12</sub> antagonist, with clopidogrel in percutaneous coronary intervention; Results of the Joint Utilization of Medications to Block Platelets Optimally (JUMBO) – TIMI 26 trial. *Circulation* 2005;111:3366-73.
2. Bonaca MP, Morrow DA, Sabatine MS, Murphy SA, Scirica BM, Rifai N, Antman EM, Braunwald E. Clinical correlates and impact of aspirin on the inflammatory response to percutaneous coronary intervention: Results from TIMI 26. *Circulation* 2005;112:II:322.
3. Wiviott SD, Morrow DA, Sabatine MS, Murphy SA, Winters KJ, Antman EM, Braunwald E. Prasugrel suppresses the early rise of sCD40 ligand levels following PCI compared to clopidogrel: A JUMBO-TIMI 26 substudy. *Circulation* 2005;112:II:432.

4. Bonaca MP, Wiviott SD, Sabatine M, Buros J, Murphy SA, Scirica BM, Rifai N, Antman EM, Morrow DA. Hemodynamic significance of peri-procedural myocardial injury assessed with N-terminal pro-B-type natriuretic peptide after percutaneous coronary intervention in patients with stable and unstable coronary artery disease from the JUMBO-TIMI 26 trial. *Am J Cardiol* 2007;99:344-348.

### **PROXIMATE-TIMI 27**

**OBJECTIVE: To evaluate the safety and hemostatic effects of a monoclonal antibody to tissue factor in patients with stable coronary disease**

1. Morrow DA, Murphy SA, McCabe CH, Mackman N, Wong HC, Antman EM. Potent inhibition of thrombin with a monoclonal antibody against tissue factor (Sunol-cH36): results of the PROXIMATE-TIMI 27 trial. *Eur Heart J*. 2005;26:682-8.

### **CLARITY-TIMI 28**

**OBJECTIVE: To assess the efficacy and safety of adding clopidogrel to a standard fibrinolytic regimen that includes aspirin.**

1. Sabatine MS, McCabe CH, Gibson CM, Cannon CP. Design and rationale of Clopidogrel as Adjunctive Reperfusion Therapy-Thrombolysis in Myocardial Infarction (CLARITY-TIMI) 28 trial. *Am Heart J* 2005;149:227-33.
2. Sabatine MS, Cannon CP, Gibson CM, Lopez-Sendon JL, Montalescot G, Theroux P, Claeys M, Cools F, Hill KA, Skene AM, McCabe CH, Braunwald E. Addition of clopidogrel to aspirin and fibrinolytic therapy for myocardial infarction with ST-segment elevation. *N Engl J Med* 2005;352:1179-89.
3. Sabatine MS, Cannon CP, Gibson CM, Lopez-Sendon JL, Montalescot G, Theroux P, Lewis BS, Murphy SA, McCabe CH, Braunwald E. Effect of clopidogrel pretreatment before percutaneous coronary intervention in patients with ST-elevation myocardial infarction treated with fibrinolysis: The PCI-CLARITY study. *JAMA* 2005;294:1224-32.
4. Sabatine MS, Morrow DA, Montalescot G, Dellborg M, Leiva-Pons, Keltai M, Murphy SA, McCabe CH, Gibson CM, Cannon CP, Antman EM, Braunwald E. Angiographic and clinical outcomes in patients receiving low-molecular weight heparin versus unfractionated heparin in ST-elevation myocardial infarction treated with fibrinolytics in the CLARITY-TIMI 28 trial. *Circulation* 2005;112:3846-54.
5. Scirica BM, Sabatine MS, Murphy SA, Kirtane A, Aroesty J, Cannon CP, Gibson CM. Improved Findings on Late Angiography Are Associated with Lower Rates of New Q-waves in Patients Receiving Fibrinolysis for ST Elevation Myocardial Infarction - Results From CLARITY-TIMI 28. *Circulation* 2005; 112(17 Suppl II):II-693.
6. Scirica BM, Sabatine MS, Morrow DA, Gibson CM, Murphy SA, Wiviott SD, Giugliano RP, McCabe CH, Cannon CP, Braunwald E. Correlates and outcomes associated with ST segment resolution after fibrinolytic therapy. Results from the ECG CLARITY - TIMI 28 substudy. *Circulation* 2005;112:II:486.
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8. Scirica BM, Sabatine MS, Morrow DA, Gibson CM, Murphy SA, Wiviott SD, Giugliano RP, McCabe CH, Cannon CP, Braunwald E. The role of clopidogrel in early and sustained arterial patency after fibrinolysis for ST-segment elevation myocardial infarction: The ECG CLARITY-TIMI 28 study. *J Am Coll Cardiol* 2006;48:37-42.
9. Kirtane AJ, Vafai JJ, Murphy SA, Aroesty JM, Sabatine MS, Cannon CP, Gibson CM. Angiographically evident thrombus following fibrinolytic therapy is associated with impaired myocardial perfusion in STEMI: a CLARITY-TIMI 28 substudy. *Eur Heart J* 2006;27:2040-5.
10. Gibson CM, Ly HQ, Murphy SA, Ciaglio LN, Southard MC, Stein EB, Buros JL, Sabatine MS, Cannon

11. Ahmed S, Sabatine MS, Cannon CP, Murphy SA, Braunwald E, Gibson CM. Impact of reduced glomerular filtration rate on outcomes in patients with ST-segment elevation myocardial infarction undergoing fibrinolysis in CLARITY-TIMI 28. *J Am Coll Cardiol* 2006;47:159A.
12. O'Donoghue M, Sabatine MS, Wiviott SD, Murphy SA, McCabe CH, Cannon CP, Braunwald E, Gibson CM. Association of TIMI risk score and extent of coronary artery disease in patients with ST-elevation myocardial infarction: CLARITY-TIMI 28 substudy. *J Am Coll Cardiol* 2006;47:222A.
13. Verheugt FW, Montalescot G, Sabatine MS, Soulat L, Lambert Y, Lapostolle F, Adgey J, Cannon CP. Prehospital fibrinolysis with dual antiplatelet therapy in ST-elevation acute myocardial infarction: a substudy of the randomized double blind CLARITY-TIMI 28 Trial. *J Thromb Thrombolysis* 2006;22:161-4.
14. McLean DS, Sabatine MS, Guo W, McCabe CH, Cannon CP. Benefits and risks of clopidogrel pretreatment before coronary artery bypass grafting in patients with ST-elevation myocardial infarction treated with fibrinolytics in CLARITY-TIMI 28. *J Thromb Thrombolysis* 2007;24:85-91.
15. Gibson CM, Pride YB, Buros JL, Lord E, Shui A, Murphy SA, Pinto DS, Zimetbaum PJ, Sabatine MS, Cannon CP, Josephson ME, for the TIMI Study Group. Association of impaired thrombolysis in myocardial infarction myocardial perfusion grade with ventricular tachycardia and ventricular fibrillation following fibrinolytic therapy for ST-segment elevation myocardial infarction. *J Am Coll Cardiol* 2008;51:546-51.
16. Pinto DS, Kirtane AJ, Pride YB, Murphy SA, Sabatine MS, Cannon CP, Gibson CM. Association of blood glucose with angiographic and clinical outcomes among patients with ST-segment elevation myocardial infarction (from the CLARITY-TIMI-28 study). *Am J Cardiol* 2008;101:303-7.
17. Gibson CM, Pride YB, Buros JL, Kunadian V, Southard MC, Harrigan CJ, Ciaglio LN, Sabatine MS, Cannon CP, Braunwald E. Relation of hyperemic epicardial flow to outcomes among patients with ST-segment elevation myocardial infarction receiving fibrinolytic therapy. *Am J Cardiol* 2008;101:1232-8.
18. Gibson CM, Murphy SA, Kirtane AJ, Aroesty JM, Sabatine MS, Cannon CP, Braunwald E. Effects of pre-treatment with clopidogrel on non-emergent percutaneous coronary intervention after fibrinolytic administration in ST elevation myocardial infarction: A Clopidogrel as Adjustive Reperfusion Therapy - Thrombolysis in Myocardial Infarction (CLARITY-TIMI) 28 study. *Am Heart J* 2008;155:133-9.
19. O'Donoghue M, Morrow DA, Cannon CP, Guo W, Murphy SA, Gibson CM, Sabatine MS. Association Between Baseline Neutrophil Count, Clopidogrel Therapy, and Clinical and Angiographic Outcomes in Patients with ST-Elevation Myocardial Infarction Receiving Fibrinolytic Therapy. *Eur Heart J* 2008;29:984-91.
20. Sabatine MS, Hamdalla HN, Mehta SR, Fox KA, Topol EJ, Steinhubl SR, Cannon CP. Efficacy and safety of clopidogrel pretreatment before percutaneous coronary intervention with and without glycoprotein IIb/IIIa inhibitor use. *Am Heart J* 2008;155:910-7.
21. Sabatine MS, Morrow DA, Higgins LJ, MacGillivray C, Guo W, Bode C, Rifai N, Cannon CP, Gerszten RE, Lee RT. Complementary roles for biomarkers of biomechanical strain ST2 and N-terminal prohormone B-type natriuretic peptide in patients with ST-elevation myocardial infarction. *Circulation* 2008;117:1936-44.

### **ADVANCE MI-TIMI 29**

**OBJECTIVE: To evaluate the efficacy and safety of facilitated PCI following the combination of reduced dose TNK-tpa and eptifibatide compared to primary PCI with eptifibatide alone.**

1. **ADVANCE MI Investigators. Facilitated percutaneous coronary intervention for acute ST-segment elevation myocardial infarction: Results from the prematurely terminated ADdressing the Value of facilitated ANgioplasty after Combination therapy or Eptifibatide monotherapy in acute Myocardial Infarction (ADVANCE MI) trial** *Am Heart J* 2005;150:116-22.

### **PROTECT-TIMI 30**

**OBJECTIVE: To evaluate the angiographic efficacy of bivalirudin vs eptifibatide for coronary stenting.**

1. Gibson CM, Morrow DA, Murphy SA, Palabrica TM, Jennings LK, Stone PH, Lui HH, Bulle T, Lakkis N, Kovach R, Cohen DJ, Fish P, McCabe CH, Braunwald E for the TIMI Study Group: A randomized trial to evaluate the relative protection against post-percutaneous coronary intervention microvascular dysfunction, ischemia and inflammation among anti-platelet and anti-thrombotic agents The PROTECT-TIMI 30 trial. *J Am Coll Cardiol* 2006;47:2364-73.
2. Gibson CM, Karpalotis D, Kosmidou I, Murphy SA, Kirtane AJ, Budiu D, Ray KK, Herrmann HC, Lakkis N, Kovach R, French W, Blankenship J, Lui HH, Palabrica T, Jennings LK, Cohen DJ, Morrow DA; TIMI Study Group. Comparison of effects of bare metal versus drug-eluting stent implantation on biomarker levels following percutaneous coronary intervention for non-ST-elevation acute coronary syndrome. *Am J Cardiol* 2006;97:1473-7.
3. Kirtane AJ, Piazza G, Murphy SA, Budiu D, Morrow DA, Cohen DJ, Peterson E, Lakkis N, Herrmann HC, Palabrica TM, Gibson CM; TIMI Study Group. Correlates of bleeding events among moderate- to high-risk patients undergoing percutaneous coronary intervention and treated with eptifibatide: observations from the PROTECT-TIMI-30 trial. *J Am Coll Cardiol* 2006;47:2374-9.
4. Gibson CM, Kirtane AJ, Morrow DA, Palabrica TM, Murphy SA, Stone PH, Scirica B, Jennings LK, Herrmann HC, Cohen DJ, McCabe CH, Braunwald E. Association between Thrombolysis in Myocardial Infarction myocardial perfusion grade, biomarkers, and clinical outcomes among patients with moderate to high-risk acute coronary syndromes: Observations from the PROTECT-TIMI 30 trial. *Am Heart J* 2006;152:756-61.

### **TIMI 31**

**OBJECTIVE: To evaluate the efficacy, safety, and pharmacokinetics of a novel fibrinolytic agent, BB-10153, in patients with ST-elevation myocardial infarction.**

1. Gibson CM, Zorkun C, Molhoek P, Zmudka K, Greenberg M, Mueller H, Wesdorp J, Louwerenburg H, Niederman A, Westenburg J, Bikkina M, Batty J, de Winter J, Murphy SA, McCabe CH. Dose escalation trial of the efficacy, safety, and pharmacokinetics of a novel fibrinolytic agent, BB-10153, in patients with ST elevation MI: Results of the TIMI 31 trial. *J Thromb Thrombolysis* 2006;22:13-21.

### **ANTHEM-TIMI 32**

**OBJECTIVE: To assess the efficacy and safety of anticoagulation with rNAPc2 in non-ST segment elevation acute coronary syndrome patients managed with an early invasive strategy.**

1. Giugliano RP, Wiviott SD, Stone PH, Simon DI, Schweiger MJ, Bouchard A, Leesar MA, Goulder MA, Deitcher SR, McCabe CH, Braunwald E. Recombinant nematode anticoagulant protein C2 (rNAPc2) in patients with non-ST-elevation acute coronary syndrome – the ANTHEM - TIMI 32 trial. *J Am Coll Cardiol* 2007;49:2398-407.

### **DISPERSE2-TIMI 33**

**OBJECTIVE: To evaluate the safety, tolerability, and efficacy of AZD6140, an oral reversible ADP receptor antagonist, compared with clopidogrel in patients with non-ST segment elevation acute coronary syndrome.**

1. Cannon CP, Husted S, Harrington RA, Scirica BM, Emanuelsson H, Peters G, Storey RF; DISPERSE-2 Investigators. Safety, tolerability, and initial efficacy of AZD6140, the first reversible oral adenosine diphosphate receptor antagonist, compared with clopidogrel, in patients with non-ST-segment elevation acute coronary syndrome: primary results of the DISPERSE-2 trial. *J Am Coll Cardiol* 2007;50:1844-51.
2. Cannon CP, Harrington RA, Mahaffey KW, Husted S, Storey RF, Sanders N, Peters G, Emanuelsson H. Clinical outcomes with AZD6140, an oral reversible ADP receptor antagonist, compared with clopidogrel in patients with acute coronary syndromes (ACS). *J Am Coll Cardiol* 2006;47:199A-200A.
3. Husted S, Harrington RA, Cannon CP, Storey RF, Wickens M, Price D, Emanuelsson H. AZD6140, a reversible oral ADP receptor antagonist, does not increase risk of bleeding vs the thienopyridine clopidogrel in patients undergoing CABG surgery in the DISPERSE2 trial. *Am J Cardiol* 2006;S:521.
4. Storey RF, Harrington RA, Husted S, Heptinstall S, Wilcox RG, Gurbel PA, Grande P, Sanders N, Peters G, Emanuelsson H, Cannon CP. AZD6140 yields additional suppression of platelet aggregation in patients with acute coronary syndromes previously treated with clopidogrel. *J Am Coll Cardiol* 2006;47:204A.
5. Emanuelsson H, Mahaffey KW, Harrington RA, Husted S, Storey RF, Sanders N, Peters G, Cannon CP. Can greater inhibition of platelet aggregation be tolerated? Evaluation of the bleeding risk of AZD6140 compared with clopidogrel (CLOP) in patients with acute coronary syndromes (ACS). *J Am Coll Cardiol* 2006;47:212A.
6. Husted S, Storey RF, Harrington RA, Sanders N, Peters G, Emanuelsson H, Cannon CP. The effects of AZD6140, the first oral reversible ADP receptor antagonist, compared with clopidogrel on biochemical markers in patients with acute coronary syndromes (ACS). *J Am Coll Cardiol* 2006;47:200A.
7. Storey RF, Husted S, Harrington RA, Heptinstall S, Wilcox RG, Peters G, Wickens M, Emanuelsson H, Gurbel P, Grande P, Cannon CP. Inhibition of platelet aggregation by AZD6140, a reversible oral P2Y12 receptor antagonist, compared with clopidogrel in patients with acute coronary syndromes. *J Am Coll Cardiol* 2007;50:1852-6.

### **TITAN-TIMI 34**

**OBJECTIVE: To evaluate initiation of eptifibatide in the emergency department versus at the time of percutaneous intervention for patients with ST-elevation myocardial infarction.**

1. Gibson CM, Kirtane AJ, Murphy SA, Rohrbeck S, Menon V, Lins J, Kazziha S, Rokos I, Shammass NW, Palabrica TM, Fish P, McCabe CH, Braunwald E. Early initiation of eptifibatide in the emergency department before primary percutaneous coronary intervention for ST-segment elevation myocardial infarction: Results of the time to integrilin therapy in acute myocardial infarction (TITAN) - TIMI 34 Trial. *Am Heart J* 2006;152:668-75.
2. Gibson CM, Buros J, Ciaglo LN, Southard MC, Takao S, Harrigan C, Filopei J, Lew M, Marble SJ, Murphy SA, Cohen MG; TITAN-TIMI 34 Investigators. Impact of iodinated contrast injections on percent diameter coronary arterial stenosis and implications for trials of intracoronary pharmacotherapies in patients with ST-elevation myocardial infarction. *Am J Cardiol* 2007;100:13-7.

### **PROMPT-TIMI 35**

**OBJECTIVE: To evaluate novel protein markers of ischemia using proteomic testing in a prospective cohort of patients with stable coronary disease undergoing exercise stress testing.**

1. Sabatine MS, Morrow DA, de Lemos JA, Omland T, Desai MY, Tanasijevic M, Hall C, McCabe CH, Braunwald E. Acute changes in circulating natriuretic peptide levels in relation to myocardial ischemia. *J Am Coll Cardiol* 2004;44:1988-95.
2. Sabatine MS, Liu E, Morrow DA, Heller E, McCarroll R, Wiegand R, Berriz GF, Roth FP, Gerszten RE. Metabolomic identification of novel biomarkers of myocardial ischemia. *Circulation* 2005;112:3868-75.

### **MERLIN-TIMI 36**

**OBJECTIVE: To evaluate a novel anti-ischemic agent, ranolazine, in patients with acute coronary syndromes.**

1. Morrow DA, Scirica BM, Karwowska-Prokopczuk E, Skene A, McCabe CH, Braunwald E for the MERLIN-TIMI 36 Investigators. Evaluation of a novel anti-ischemic agent in acute coronary syndromes: Design and rationale for the Metabolic Efficiency with Ranolazine for Less Ischemia in Non-ST elevation acute coronary syndromes (MERLIN) – TIMI 36 trial. *Am Heart J* 2006;151:1186e1-9.
2. Morrow DA, Scirica BM, Karwowska-Prokopczuk E, Murphy SA, Budaj A, Varshavsky S, Wolff AA, Skene A, McCabe CH, Braunwald E. Effects of ranolazine on recurrent cardiovascular events in patients with non-ST-elevation acute coronary syndromes. The MERLIN-TIMI 36 randomized trial. *JAMA* 2007;297:1775-83.
3. Scirica BM, Morrow DA, Hod H, Murphy SA, Belardinelli L, Hedgepeth CM, Molhoek P, Verheugt FWA, Gersh BJ, McCabe CH, Braunwald E. Effect of ranolazine, an antianginal agent with novel electrophysiological properties, on the incidence of arrhythmias in patients with non-ST-segment elevation acute coronary syndrome: Results from the Metabolic Efficiency with Ranolazine for Less Ischemia in Non ST-Elevation Acute Coronary Syndrome Thrombolysis in Myocardial Infarction 36 (MERLIN-TIMI 36) randomized controlled trial. *Circulation* 2007;116:1647-52.
4. Bonaca MP, Scirica BM, Sabatine MS, Dalby A, Spinar J, Melanson S, Jarolim P, Morrow DA. Prospective evaluation of the prognostic implications of low level elevation of cardiac troponin using a

new highly-sensitive assay for cardiac troponin I: results from the MERLIN-TIMI 36 trial. *Circulation* 2007; 116(16 Suppl II):II-381.

5. Mega JL, Hochman JS, Scirica BM, Murphy SA, McCabe CH, Merlini P, Niguarda O, Morrow DA. . Anti-ischemic effects of ranolazine in women: results from the randomized, placebo-controlled MERLIN-TIMI 36 trial. *Circulation* 2007; 116(16 Suppl II):II-538.
6. Arnold SV, Morrow DA, Wang K, Lei Y, Mahoney EM, Kempf JA, Scirica BM, Cohen DJ. Effects of ranolazine on disease-specific health status and quality of life: results from the MERLIN-TIMI 36 Randomized Trial. *J Am Coll Cardiol* 2008;51:A215.
7. Scirica BM, Sabatine MS, Jarolim P, Sloan S, Murphy SA, de Lemos JL, Morrow DA. Myeloperoxidase levels associated with risk of cardiovascular death and heart failure after non-ST elevation acute coronary syndrome. *J Am Coll Cardiol* 2008;51:A218.
8. Mega JL, Scirica BM, Qin J, Gibson CM, Morrow DA. Chronic kidney disease, cardiovascular outcomes, and treatment disparities following non-ST elevation myocardial infarction. *J Am Coll Cardiol* 2008;51:A220.
9. Wilson SR, Morrow DA, Scirica BM, Murphy SA, Buros JL, McCabe CH, Braunwald E. Efficacy and safety of ranolazine in chronic angina: observations from the randomized, double-blind, placebo-controlled MERLIN-TIMI 36 trial. *J Am Coll Cardiol* 2008;51:A225.

### **TRITON-TIMI 38**

**OBJECTIVE: To evaluate prasugrel compared with clopidogrel in patients with acute coronary syndromes.**

1. **Wiviott SD, Antman EM, Gibson CM, Montalescot G, Riesmeyer J, Weerakkody G, Winters KJ, Warmke JW, McCabe CH, Braunwald E. Evaluation of prasugrel compared with clopidogrel in patients with acute coronary syndromes: design and rationale for the TRial to assess Improvement in Therapeutic Outcomes by optimizing platelet Inhibition with prasugrel Thrombolysis In Myocardial Infarction 38 (TRITON-TIMI 38). *Am Heart J* 2006;152(4):627-35.**
2. **Wiviott SD, Braunwald E, McCabe CH, Montalescot G, Ruzyllo W, Gottlieb S, Neumann FJ, Ardissino D, De Servi S, Murphy SA, Riesmeyer J, Weerakkody G, Gibson CM, Antman EM, for the TRITON-TIMI 38 Investigators. Prasugrel versus clopidogrel in patients with acute coronary syndromes. *NEJM* 2007;357:2001-2015.**
3. Wiviott SD, Braunwald E, Murphy SA, Antman EM, for the TRITON-TIMI 38 Investigators. A perspective on the efficacy and safety of intensive antiplatelet therapy with prasugrel in the Trial to Assess Improvement in Therapeutic Outcomes by Optimizing Platelet Inhibition with Prasugrel-Thrombolysis in Myocardial Infarction 38. *Am J Cardiol* 2008;101:1367-1370.
4. Wiviott SD, Braunwald E, McCabe CH, Horvath I, Keltai M, Herman JR, Van de Werf F, Downey WE, Scirica BM, Murphy SA, Antman EA, for the TRITON-TIMI 38 Investigators. Intensive oral antiplatelet therapy for reduction of ischaemic events including stent thrombosis in patients with acute coronary syndromes treated with percutaneous coronary intervention and stenting in the TRITON-TIMI 38 trial: a subanalysis of a randomised trial. *Lancet* 2008;371:1353-1363.
5. Antman EM, Wiviott SD, Murphy SA, Voitek J, Hasin Y, Wisimsky P, Chandna H, Macias W, McCabe CH, Braunwald E. Early and late benefits of prasugrel in patients with acute coronary syndromes undergoing percutaneous coronary intervention: a TRITON-TIMI 38 analysis. *J Am Coll Cardiol* 2008;51:2028-2033.
6. Murphy SA, Antman EM, Wiviott SD, Weerakkody G, Morocutti G, Huber K, Lopez-Sendon J, McCabe CH, Braunwald E. Reduction in recurrent cardiovascular events with prasugrel compared with clopidogrel in patients with acute coronary syndromes from the TRITON-TIMI 38 trial. *Eur Heart J* 2008;29:2473-9.
7. Wiviott SD, Braunwald E, Angiolillo DJ, Meisel S, Dalby AJ, Verheugt FWA, Goodman SG, Corbalan R, Purdy DA, Murphy SA, McCabe CH, Antman EM. Greater clinical benefit of more intensive oral antiplatelet therapy with prasugrel in patients with diabetes mellitus in the Trial to Assess Improvement in Therapeutic Outcomes by Optimizing Platelet Inhibition With Prasugrel-Thrombolysis in Myocardial Infarction 38. *Circulation* 2008;118:1626-36.

### **EARLY ACS-TIMI 39**

**OBJECTIVE: To assess the clinical benefits of early front-loaded eptifibatide in the treatment of patients with non-ST segment elevation acute coronary syndrome.**

1. Giugliano RP, Newby KL, Harrington RA, Gibson CM, van de Werf F, Armstrong PW, Montalescot G, Gilbert J, Strony JT, Califf RM, Braunwald E. The early glycoprotein IIb/IIIa inhibition in non-ST-segment elevation acute coronary syndrome (Early-ACS) trial. A randomized, placebo-controlled trial evaluating the clinical benefits of early front-loaded eptifibatide in the treatment of patients with non-ST-segment elevation acute coronary syndrome – Study design and rationale. *Am Heart J* 2005;149:994-1002.

### **PRINCIPLE-TIMI 44**

**OBJECTIVE: To compare prasugrel versus higher loading and maintenance doses of clopidogrel for inhibiting platelet aggregation in patients undergoing elective percutaneous intervention.**

1. Wiviott SD, Trenk D, Frelinger AL, O'Donoghue M, Neumann F-J, Michelson AD, Angiolillo DJ, Hod H, Montalescot G, Miller DL, Jakubowski JA, Cairns R, Murphy SA, McCabe CH, Antman EM, Braunwald E, for the PRINCIPLE-TIMI 44 Investigators. Prasugrel compared with high loading- and maintenance-dose clopidogrel in patients with planned percutaneous coronary intervention; The Prasugrel in Comparison to Clopidogrel for Inhibition of Platelet Activation and Aggregation-Thrombolysis in Myocardial Infarction 44 Trial. *Circulation* 2007;116:2923-2932.

### **ADDITIONAL PUBLICATIONS**

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