UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of report (date of earliest event reported): June 9, 2022

TONIX PHARMACEUTICALS HOLDING CORP.

(Exact name of registrant as specified in its charter)

Nevada	**001-36019**	**26-1434750**
(State or Other Jurisdiction of Incorporation)	**(Commission File Number)**	**(IRS Employer Identification No.)**

26 Main Street, Chatham, New Jersey 07928
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (862) 904-8182

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock	TNXP	The NASDAQ Capital Market

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Item 7.01 Regulation FD Disclosure.

Tonix Pharmaceuticals Holding Corp. (the "Company") announced data from three oral presentations (the "Presentations") at the 2022 American Transplant Congress ("ATC") by faculty at the Center for Transplantation Sciences, Massachusetts General Hospital. A copy of the press release that discusses this matter is filed as Exhibit 99.01 hereto and incorporated herein by reference. The Presentations, which may contain nonpublic information, are filed as Exhibits 99.02, 99.03 and 99.04 hereto and incorporated herein by reference.

The information in this Item 7.01 of this Current Report on Form 8-K, including Exhibits 99.01, 99.02, 99.03 and 99.04 attached hereto, shall not be deemed "filed" for purposes of Section 18 of the United States Securities Exchange Act of 1934 (the "Exchange Act") or otherwise subject to the liabilities of that section, nor shall they be deemed incorporated by reference in any filing under the United States Securities Act of 1933 or the Exchange Act, except as shall be expressly set forth by specific reference in such a filing.

Forward- Looking Statements

This Current Report on Form 8-K contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934 and Private Securities Litigation Reform Act, as amended, including those relating to the Company's product development, clinical trials, clinical and regulatory timelines, market opportunity, competitive position, possible or assumed future results of operations, business strategies, potential growth opportunities and other statement that are predictive in nature. These forward-looking statements are based on current expectations, estimates, forecasts and projections about the industry and markets in which we operate and management's current beliefs and assumptions.

These statements may be identified by the use of forward-looking expressions, including, but not limited to, "expect," "anticipate," "intend," "plan," "believe," "estimate," "potential," "predict," "project," "should," "would" and similar expressions and the negatives of those terms. These statements relate to future events or our financial performance and involve known and unknown risks, uncertainties, and other factors which may cause actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such factors include those set forth in the Company's filings with the SEC. Prospective investors are cautioned not to place undue reliance on such forward-looking statements, which speak only as of the date of this press release. The Company undertakes no obligation to publicly update any forward-looking statement, whether as a result of new information, future events or otherwise.

Item 8.01 Other Events.

On June 9, 2022, the Company announced data from the Presentations at the ATC by faculty at the Center for Transplantation Sciences, Massachusetts General Hospital. The data involved studies of the Company's TNX-1500 (Fc-modified anti-CD40L monoclonal antibody) product candidate in development for the prevention of organ transplant rejection. The Presentations, entitled, "*Long-Term Rejection Free Renal Allograft Survival with Fc-Modified Anti-CD154 Antibody Monotherapy in Nonhuman Primates*," "*TNX-1500, an Fc-modified Anti-CD154 Antibody, Prolongs Nonhuman Primate Cardiac Allograft Survival*," and "*Novel Targetable Pathways in a Costimulation Pathway Blockade*" include data demonstrating that TNX-1500 showed activity in preventing organ rejection and was well tolerated in non-human primates. Blockade of CD40L with TNX-1500 monotherapy consistently prevented pathologic alloimmunity in a non-human primate cardiac allograft model without clinical thrombosis. The animal studies found that TNX-1500 retains activity to prevent rejection and preserve graft function.

Item 9.01 Financial Statements and Exhibits.

(d)

Exhibit No.	Description.
99.01	Press release of the Company, dated June 9, 2022
99.02	Long-Term Rejection Free Renal Allograft Survival with Fc-Modified Anti-CD154 Antibody Monotherapy in Nonhuman Primates
99.03	TNX-1500, an Fc-modified Anti-CD154 Antibody, Prolongs Nonhuman Primate Cardiac Allograft Survival
99.04	Novel Targetable Pathways in Costimulation Pathway Blockade
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

SIGNATURE

Pursuant to the requirement of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

TONIX PHARMACEUTICALS HOLDING CORP.

Date: June 9, 2022

By: /s/ Bradley Saenger
Bradley Saenger
Chief Financial Officer

Exhibit 99.01

Tonix Pharmaceuticals Announces Data Presentations Involving TNX-1500 (Fc-modified anti-CD40L mAb) for the Prevention of Rejection in Kidney and Heart Allograft Transplantation in Animal Models at the 2022 American Transplant Congress

Research Directed by Faculty of the Center for Transplantation Sciences, Massachusetts General Hospital

CHATHAM, N.J., June 9, 2022 (GLOBE NEWSWIRE) – Tonix Pharmaceuticals Holding Corp. (Nasdaq: TNXP) (Tonix or the Company), a clinical-stage biopharmaceutical company, today announced data from three oral presentations at the 2022 American Transplant Congress (ATC) by faculty at the Center for Transplantation Sciences, Massachusetts General Hospital. The data involve studies of Tonix's TNX-1500 (Fc-modified anti-CD40L monoclonal antibody) product candidate in development for the prevention of organ transplant rejection. The molecular target of TNX-1500 is CD40-ligand (CD40L), which is also known as CD154. Copies of the presentations are available under Scientific Presentations on the Tonix Pharmaceuticals corporate website at www.tonixpharma.com.

The presentations titled, "*Long-Term Rejection Free Renal Allograft Survival with Fc-Modified Anti-CD154 Antibody Monotherapy in Nonhuman Primates*," "*TNX-1500, an Fc-modified Anti-CD154 Antibody, Prolongs Nonhuman Primate Cardiac Allograft Survival*," and "*Novel Targetable Pathways in Costimulation Pathway Blockade*" include data demonstrating that TNX-1500 showed activity in preventing organ rejection and was well tolerated in non-human primates. Blockade of CD40L with TNX-1500 monotherapy consistently and safely prevented pathologic alloimmunity in a non-human primate cardiac allograft model without clinical thrombosis.

"There remains a significant need for new treatments with improved activity and tolerability to prevent organ transplant rejection," said Seth Lederman, M.D., Chief Executive Officer of Tonix Pharmaceuticals. "To date, there has not been a humanized anti-CD40L antibody that can effectively prevent transplant rejections with acceptable level of tolerability. TNX-1500 is a third generation anti-CD40L mAb that has been designed by protein engineering to decrease FcγRII binding and to reduce the potential for thrombosis. The animal studies found that TNX-1500 retains activity to prevent rejection and preserve graft function. We believe TNX-1500 has the potential for treating and preventing organ transplant rejection."

About Tonix Pharmaceuticals Holding Corp.[1]

Tonix is a clinical-stage biopharmaceutical company focused on discovering, licensing, acquiring and developing therapeutics to treat and prevent human disease and alleviate suffering. Tonix's portfolio is composed of central nervous system (CNS), rare disease, immunology and infectious disease product candidates. Tonix's CNS portfolio includes both small molecules and biologics to treat pain, neurologic, psychiatric and addiction conditions. Tonix's lead CNS candidate, TNX-102 SL (cyclobenzaprine HCl sublingual tablet), is in mid-Phase 3 development for the management of fibromyalgia with a new Phase 3 study launched in the second quarter of 2022 and interim data expected in the first quarter of 2023. TNX-102 SL is also being developed to treat Long COVID, a chronic post-acute COVID-19 condition. Tonix expects to initiate a Phase 2 study in Long COVID in the second quarter of 2022. TNX-1300 (cocaine esterase) is a biologic designed to treat cocaine intoxication that is expected to start a Phase 2 trial in the second quarter of 2022. TNX-1300 has been granted Breakthrough Therapy Designation by the FDA. Finally, TNX-1900 (intranasal potentiated oxytocin), a small molecule in development for chronic migraine, is expected to enter the clinic with a Phase 2 study in the second half of 2022. Tonix's rare disease portfolio includes TNX-2900 (intranasal potentiated oxytocin) for the treatment of Prader-Willi syndrome. TNX-2900 has been granted Orphan-Drug Designation by the FDA. Tonix's immunology portfolio includes biologics to address organ transplant rejection, autoimmunity and cancer, including TNX-1500 which is a humanized monoclonal antibody targeting CD40-ligand being developed for the prevention of allograft and xenograft rejection and for the treatment of autoimmune diseases. A Phase 1 study of TNX-1500 is expected to be initiated in the second half of 2022. Tonix's infectious disease pipeline consists of a vaccine in development to prevent smallpox and monkeypox called TNX-801, next-generation vaccines to prevent COVID-19, and a platform to make fully human monoclonal antibodies to treat COVID-19. Tonix's lead vaccine candidates for COVID-19 are TNX-1840 and TNX-1850, which are live virus vaccines based on Tonix's recombinant pox live virus vector vaccine platform.

[1] *All of Tonix's product candidates are investigational new drugs or biologics and have not been approved for any indication.*

This press release and further information about Tonix can be found atwww.tonixpharma.com.

Forward Looking Statements

Certain statements in this press release are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. These statements may be identified by the use of forward-looking words such as "anticipate," "believe," "forecast," "estimate," "expect," and "intend," among others. These forward-looking statements are based on Tonix's current expectations and actual results could differ materially. There are a number of factors that could cause actual events to differ materially from those indicated by such forward-looking statements. These factors include, but are not limited to, risks related to the failure to obtain FDA clearances or approvals and noncompliance with FDA regulations; delays and uncertainties caused by the global COVID-19 pandemic; risks related to the timing and progress of clinical development of our product candidates; our need for additional financing; uncertainties of patent protection and litigation; uncertainties of government or third party payor reimbursement; limited research and development efforts and dependence upon third parties; and substantial competition. As with any pharmaceutical under development, there are significant risks in the development, regulatory approval and commercialization of new products. Tonix does not undertake an obligation to update or revise any forward-looking statement. Investors should read the risk factors set forth in the Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the Securities and Exchange Commission (the "SEC") on March 14, 2022, and periodic reports filed with the SEC on or after the date thereof. All of Tonix's forward-looking statements are expressly qualified by all such risk factors and other cautionary statements. The information set forth herein speaks only as of the date thereof.

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(443) 213-0505

Exhibit 99.02

Financial Disclosures

- Funding is provided for these studies via NIH Grants and Tonix Pharmaceuticals Inc.

HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Long-term rejection free renal allograft survival with Fc-modified anti-CD154 antibody monotherapy in nonhuman primates.

Grace Lassiter, Takayuki Hirose, Ashley D'Attilio, Ryo Otsuka,
Ahmad Karadagi, Toshihide Tomosugi, Tatsuo Kawai

MASSACHUSETTS GENERAL HOSPITAL
CENTER FOR TRANSPLANTATION SCIENCES

ATC2022 JUNE 4–8, 2022 / BOSTON, MA
JOHN B. HYNES CONVENTION CENTER
atcmeeting.org

Background

- Current immunosuppressive regimens have significant side effects
  - Nephrotoxicity
  - Steroid induced diabetes
  - Cytopenia
  - Increased risk of infection
  - etc…
- Belatacept is currently the only FDA approved costimulatory blockade alternative to calcineurin inhibitors.
  - Higher rate of acute cellular rejection compared to conventional immunosuppression

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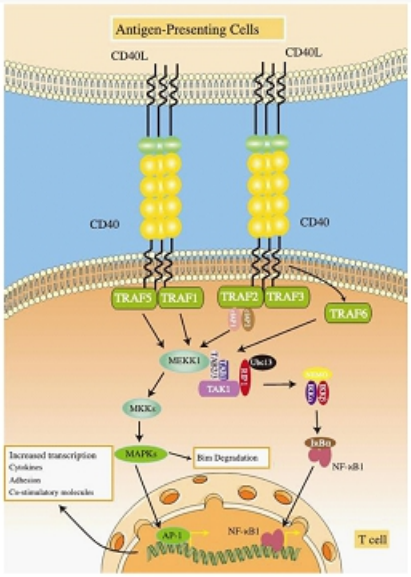
aCD154 / CD40L



- In 1999 Allan Kirk et al. tested a novel monoclonal antibody blocking the costimulatory signal in nonhuman primates (hu5c8 aCD154)
- This therapy progressed to a phase IIb clinical trial but was halted due to increased incidence of thromboembolic events

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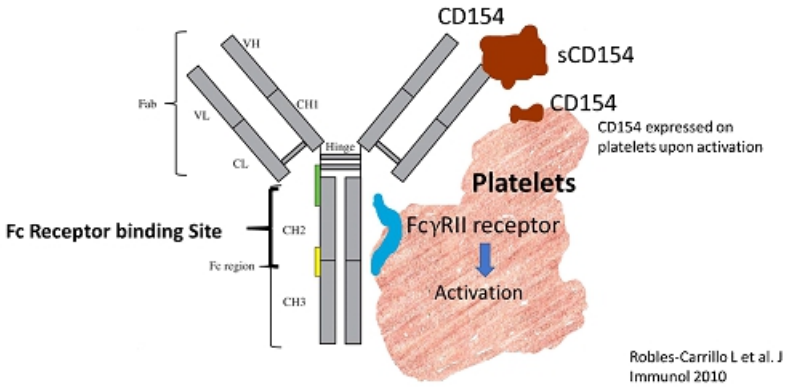
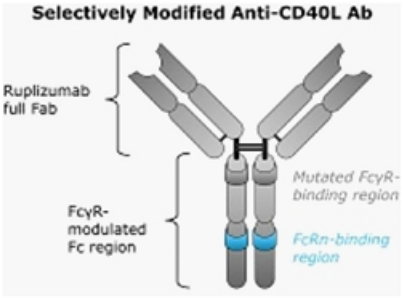
CD154 mAb-sCD154 immune complex can activate platelets



Robles-Carrillo L et al. J Immunol 2010



- To date, there has not been a fully human or humanized aCD154 antibody that can effectively prevent transplant rejections, inflammatory conditions or autoimmune conditions with an acceptable level of side effects
- Tonix Pharmaceuticals Inc. has developed an Fc-Modified aCD154 with low binding to FcγRIIa (TNX-1500)

TNX-1500 is an investigational new biologic and has not been approved for any indication

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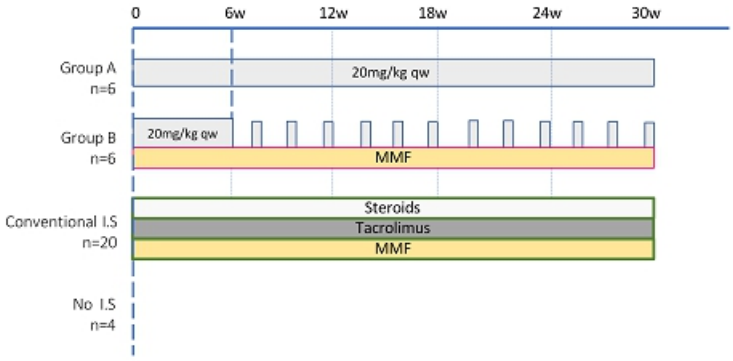
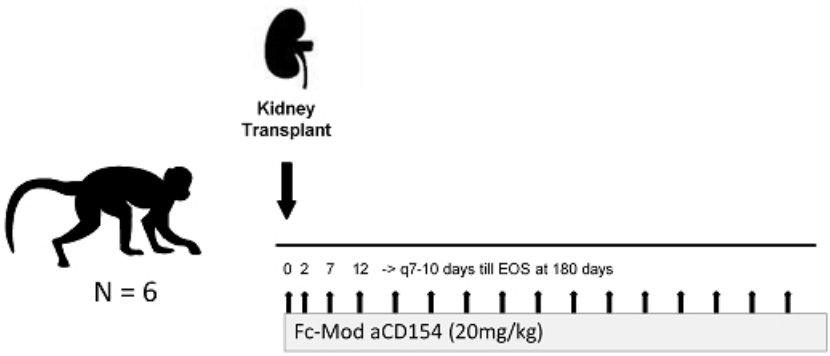
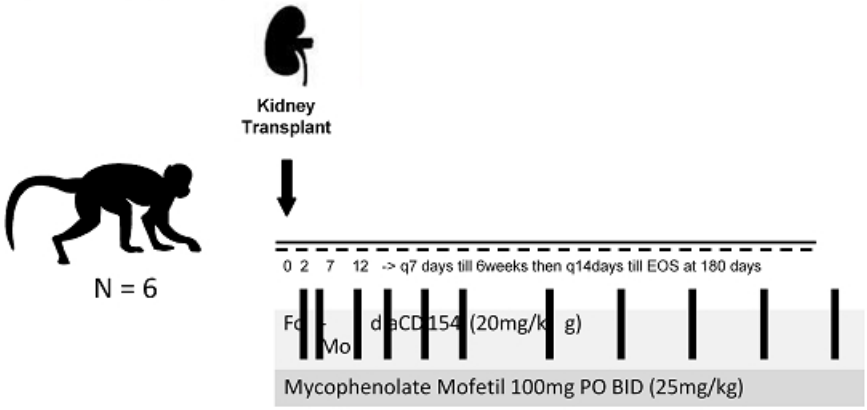
Twelve Transplants have been Completed & Compared with Historical Results



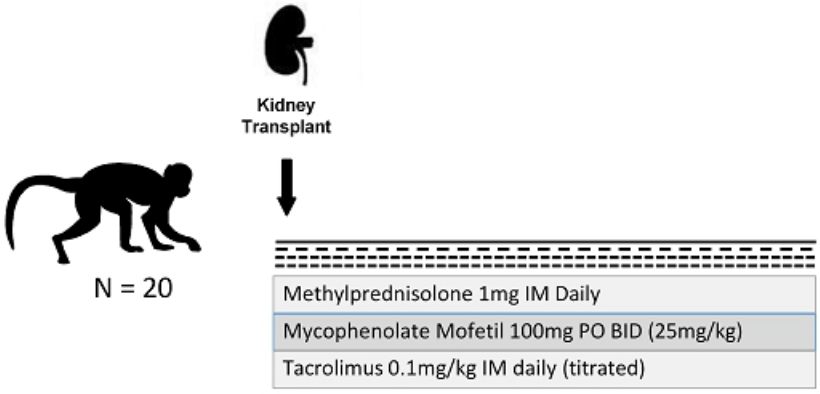
Group A Immunosuppressive Regimen



Group B Immunosuppressive Regimen



Conventional Immunosuppressive Regimen



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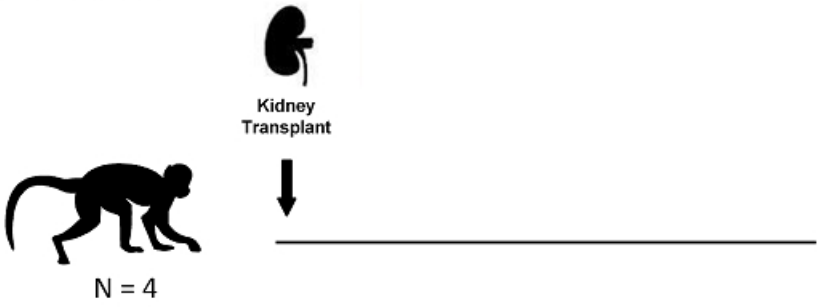
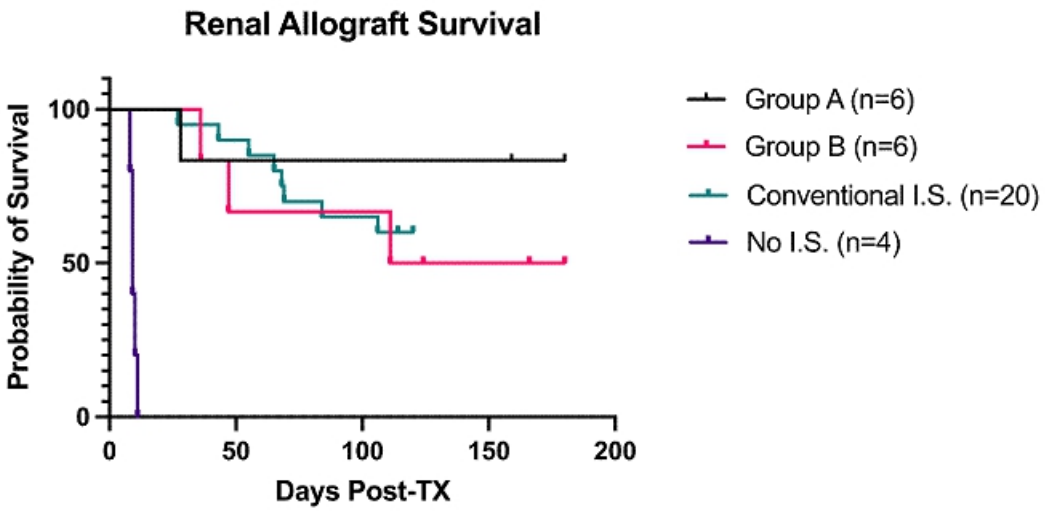
No Immunosuppressive Regimen





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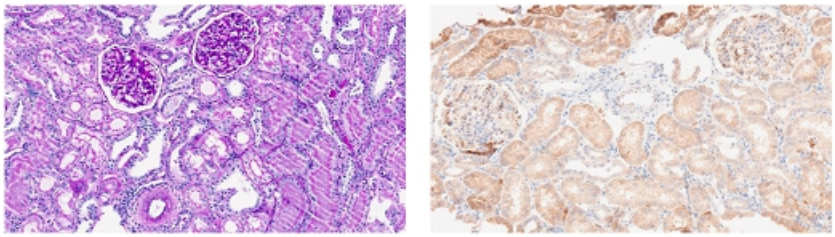
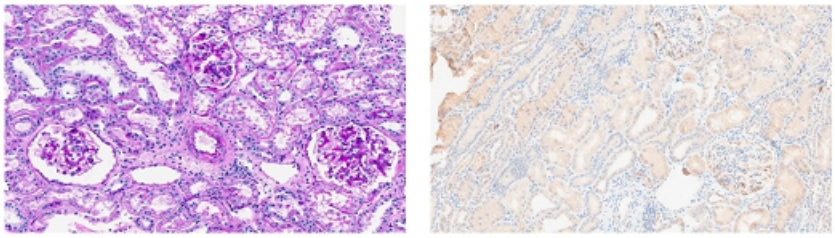
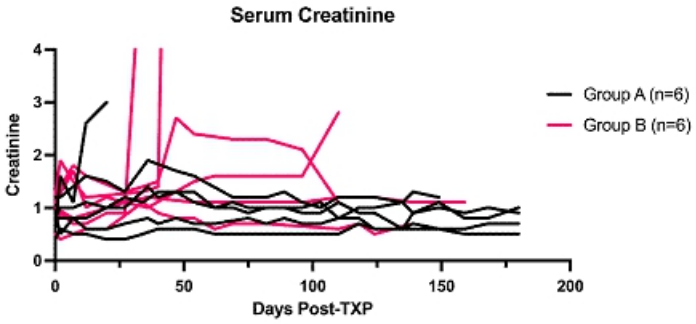


Group A NHP (1) biopsy at day 180 post transplant C4d negative



Group A NHP (2) biopsy at day 169 post transplant C4d negative

- No increased incidence of thrombosis seen
- No other evidence of end organ damage noted on Necropsy



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Group	TNX-1500	MMF	Tac	Pred	Renal allograft survival (days)
A	weekly	-	-	-	>180,>180, >180, >180, >160, 28
B	weekly for 6 weeks, followed by every 2 weeks	daily	-	-	>180, >167, >125, 111, 36, 48
Conventional I.S.	-	daily	daily	daily	>120, >120, >120, >120, >120, >120, >120, >120, >120, >120, 114, 106, 84, 69, 68, 65, 55, 43, 27
No I.S.	-	-	-	-	11,10, 9, 9, 8

Group	TNX-1500	MMF	Tac	Pred	Renal allograft survival (days)
A	weekly	-	-	-	>180,>180, >180, >180, >159, **28** Rapid rejectors
B	weekly for 6 weeks, followed by every 2 weeks	daily	-	-	>180, >166, >124, 111, **36, 48**
Conventional I.S.	-	daily	daily	daily	>120, >120, >120, >120, >120, >120, >120, >120, >120, >120, >120, 114, 106, 84, 69, 68, 65, 55, 43, 27
No I.S.	-	-	-	-	11,10, 9, 9, 8

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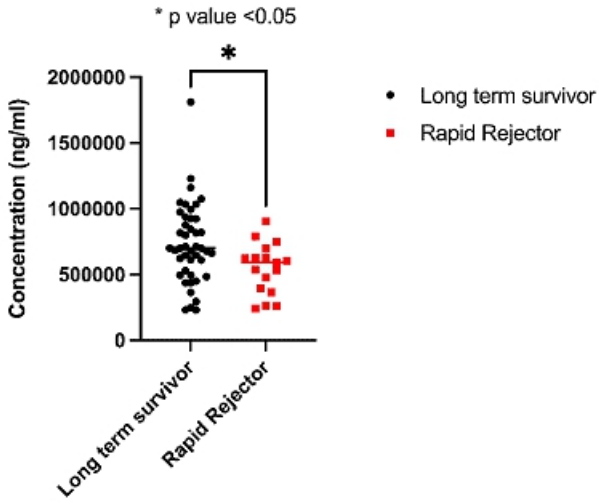
TNX-1500 Levels



Conclusion

- Fc-Modified aCD154 is well tolerated and can be an effective alternative to conventional immunosuppression therapy in nonhuman primates.
- TNX-1500 in combination with MMF resulted in an increased rate of graft failure compared to monotherapy
- Optimal dosage remains to be defined

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Questions?

Special Thanks to these wonderful people

Takayuki Hirose
Ryo Otsuka
Ahmad Karadagi
Toshi Tomosugi
Kohei Kinoshita
Abbas Dehnadi
Cindy Miller
Jane O
Franzi Pollok
R.N. Pierson, III
A.Benedict Cosimi
Tatsuo Kawai

Knight Surgery Research Laboratory
Jessica Burke
Anet Calisir
Nick Deluca
Nelson Marquez Carvajal
Eli Smith
Michael Duggan

MGH Pathology
Ivy Rosales
Robert Colvin
Catherine Stevens

Exhibit 99.03

TNX-1500, an Fc-modified Anti-CD154 Antibody, Prolongs Nonhuman Primate Cardiac Allograft Survival

Shuhei Miura[1], Zahra H. Abady[1], Franziska Pollok[1], Madelyn Ma[1], Kohei Kinoshita[1], Siobhan Fogarty[2], Patrick Maguire[2], Bruce Daugherty[2], Seth Lederman[2], Richard N. Pierson III[1]

[1]Center for Transplantation Sciences, Massachusetts General Hospital, Boston MA,
[2]Tonix Pharmaceuticals, Chatham, NJ, USA

MASSACHUSETTS GENERAL HOSPITAL
CENTER FOR TRANSPLANTATION SCIENCES

HARVARD MEDICAL SCHOOL

Shuhei Miura, MD, Research fellow
Center for Transplantation Sciences, Massachusetts General Hospital, Boston MA

I have no financial relationships with commercial interests to disclose
AND
My presentation does not include discussion of off-label or investigational use.

SF, BD and SL are Tonix employees, and PM is a Tonix consultant
This work was supported by Tonix through a Sponsored Research Agreement.

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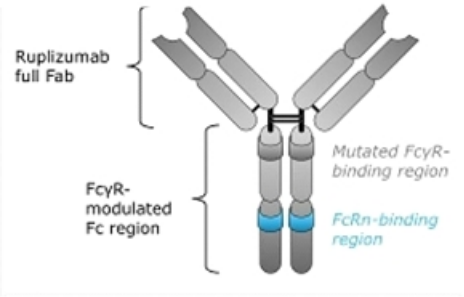
Background TNX-1500,* a novel Fc-Modified-anti CD154 mAb

TONIX PHARMACEUTICALS



- The development of humanized 5c8 (ruplizumab) was halted due to thrombotic complications seen in human clinical trials, associated with anti-CD154 Abs to an Fcγ receptor-binding.
- Several Abs engineered to down-modulate FcγR-binding, successfully avoided thrombosis, however, reduced Fc functionality was associated with reduced efficacy as monotherapy in NHP kidney transplant models.

Ferrant, et al. International Immunology 2004
Kim, et al. AST 2017

- We evaluated the preserved functional ability of TNX-1500 (TNX), containing the hu5c8 Fab and an IgG4 Fc region engineered to reduce FcγR-binding associated with the risk of thrombosis in a NHP heart transplant model.

*TNX-1500 is an investigational new biologic, and has not been approved for any indication.

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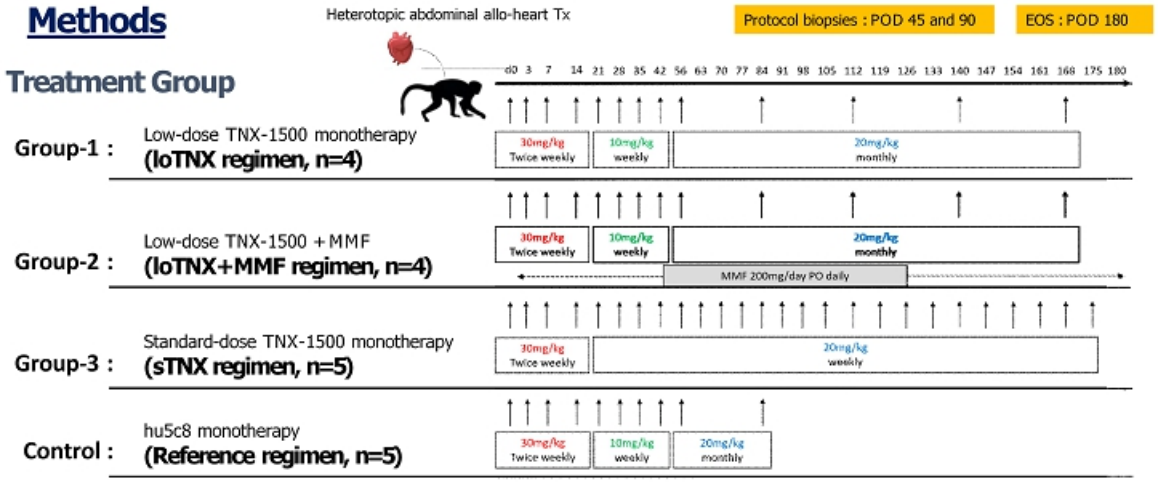
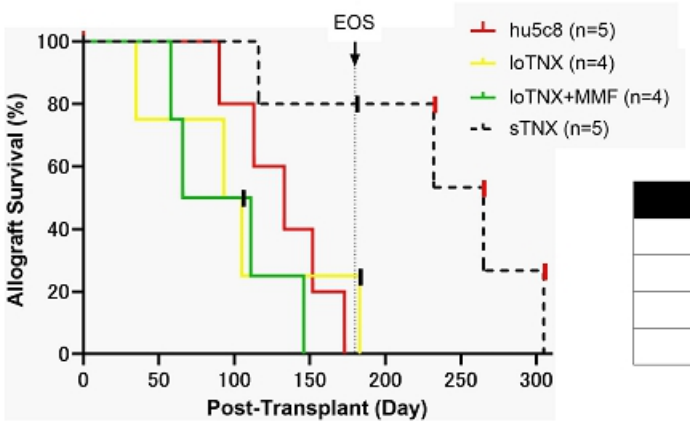
Methods



Results-1 Allograft Survival



Explant of beating graft

Rejection after cessation of sTNX treatment

Treatment Group	MST (range)
hu5c8	133 days (90-173)
loTNX	99 days (35-183)
loTNX + MMF	88 days (58-146)
sTNX	>265 days (116-305)

P<0.05 for all comparisons against sTNX

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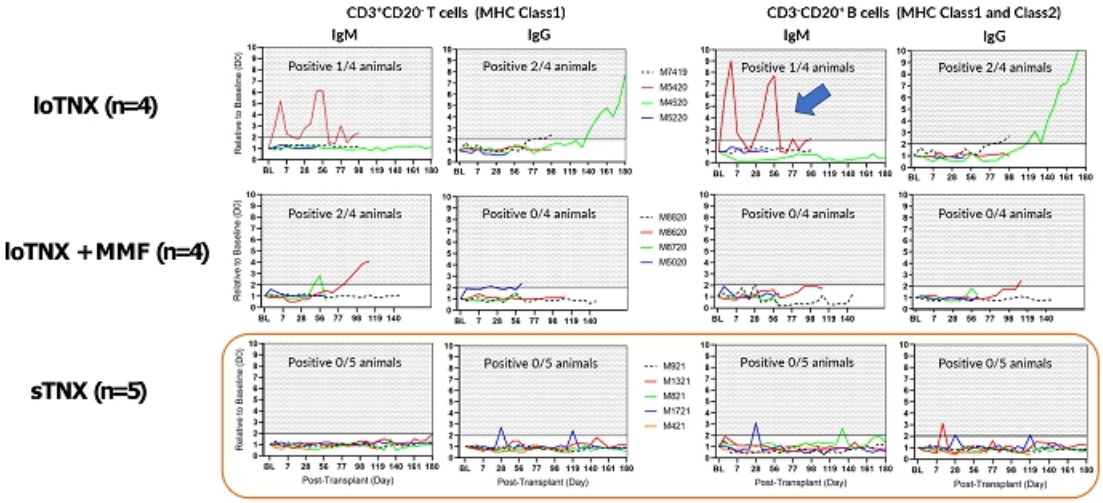
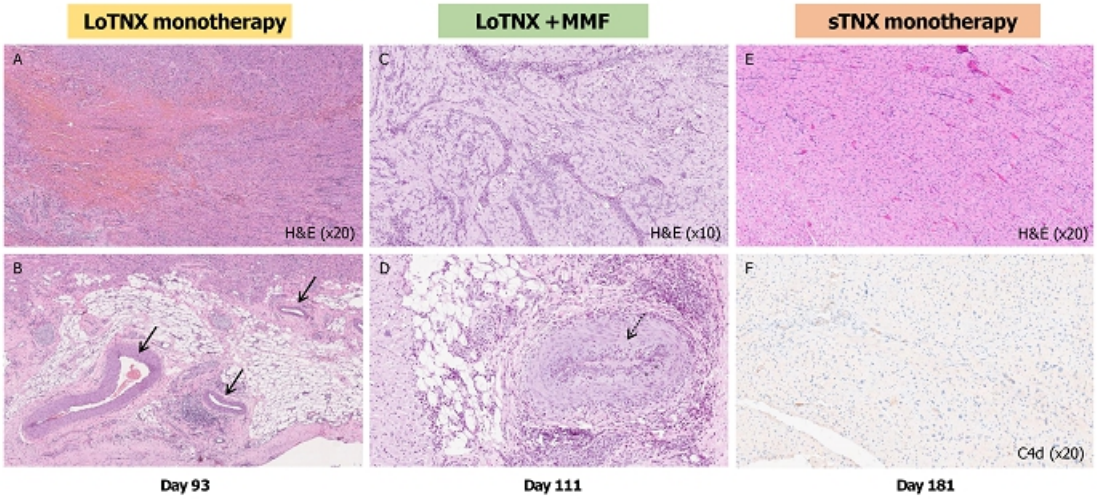
Results-2 Anti-donor-alloantibody elaboration



Results-3 Representative cardiac pathology at explant



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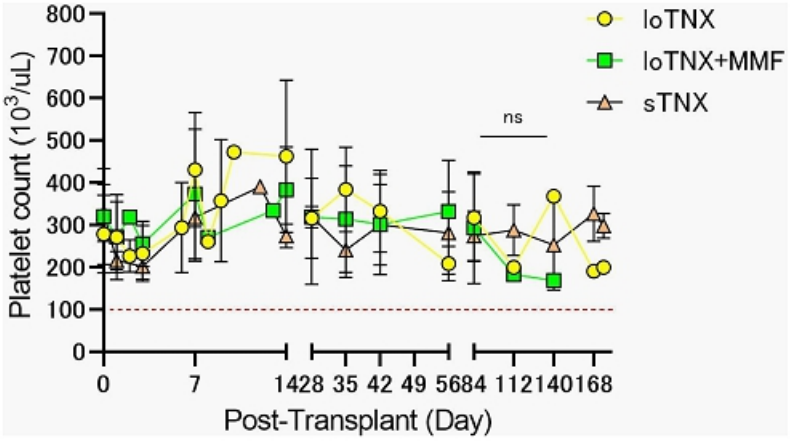
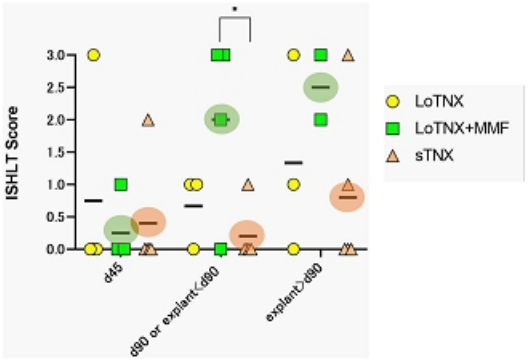
Results-4 Platelet counts

No thromboembolic complications were observed.

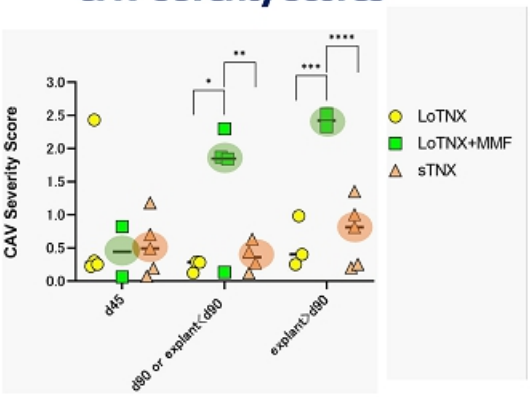


Results-5

ISHLT scores



CAV severity scores



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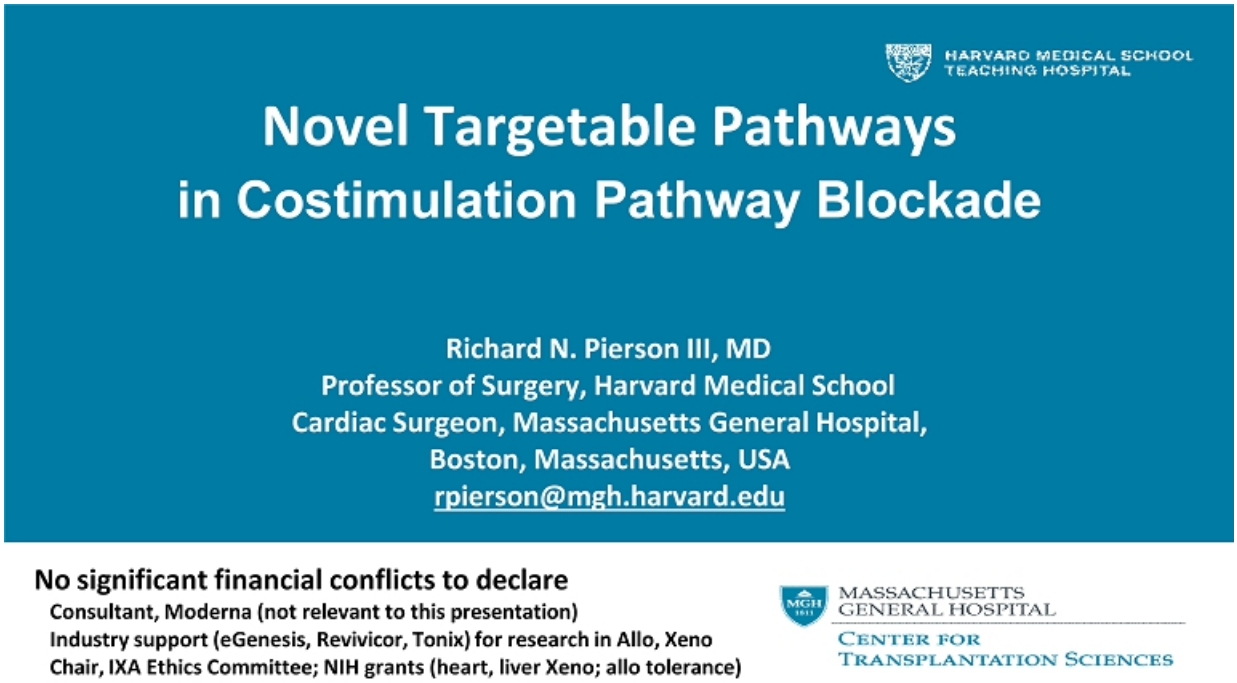
atcmeeting.org

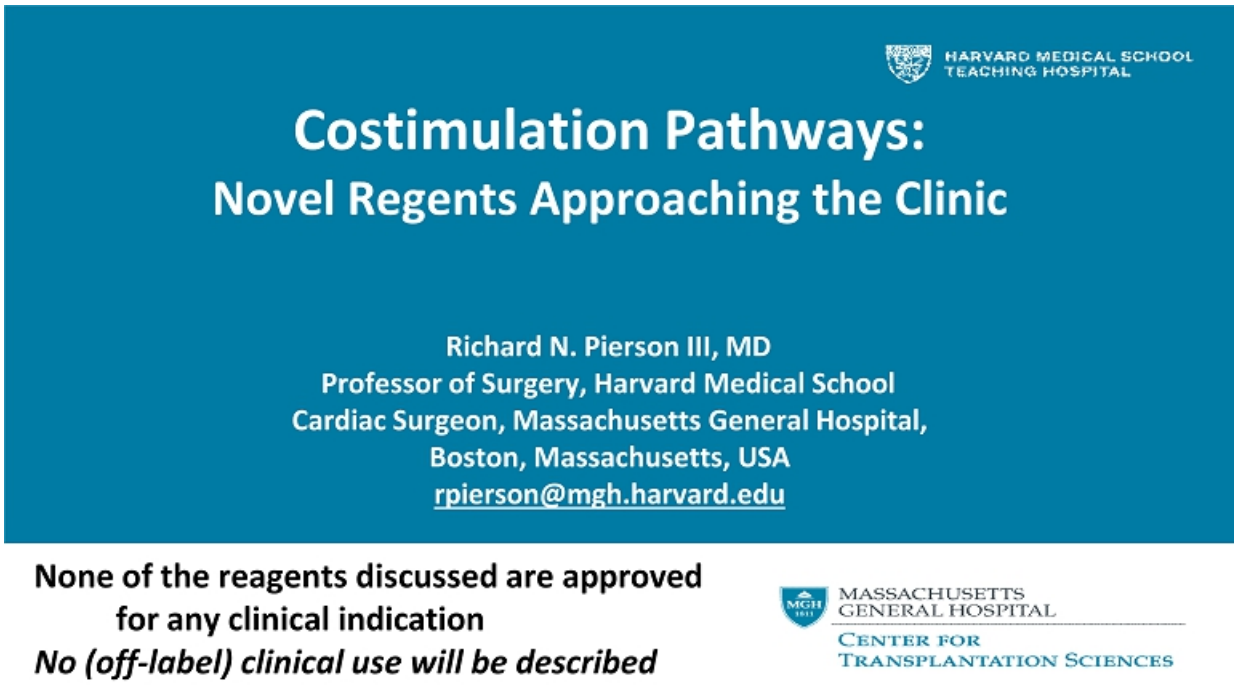
Conclusion

- Blockade of CD154 with TNX-1500 monotherapy consistently and safely prevented pathologic alloimmunity in a NHP cardiac allograft model at least as effectively as hu5c8 monotherapy, without clinical thrombotic events.

- "Standard-dose" TNX-1500 regimen was associated with prolonged allograft survival relative to "low-dose" maintenance regimen, with or without MMF, as supported by prevention of antidonor alloAb elaboration, reduced ISHLT and CAV severity scores.

Exhibit 99.04





Emerging Costimulation Blockade Approaches

CD154

TNX-1500 (Tonix)

BMS-986004 (BMS), AT-1501 (Eledon); HZN 4920 (dazodalibep, Horizon)

CD28

FR104 (OSE, Veloxis)

lulizumab (NCT04066114, BMS); Acazicolcept (Alpine, ICOSL vIgD-Fc)

CD2

Primatized Rh-loCD2bR1 (NHP Reagent Resource Center)

Siplizumab (ITBMed)

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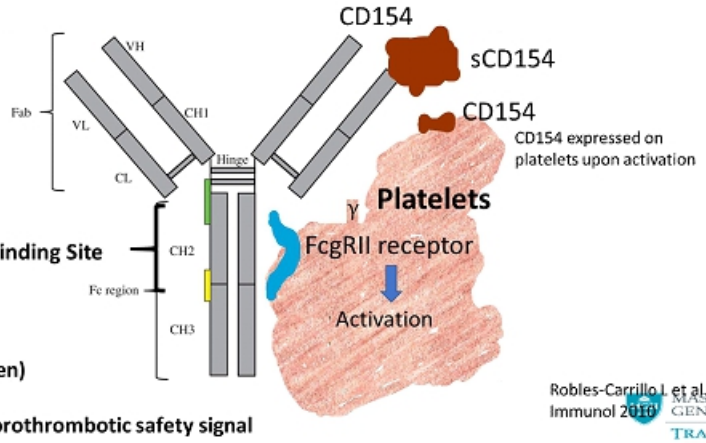
Emerging Costimulation Blockade: αCD154

IgG1 antibodies against CD154 form immune complexes with soluble CD154, activate platelets via FcγRIIa



hu5c8: Ruplizumab (Biogen)
IDEC-131: (Biogen/IDEC)
Clinical trials halted due to prothrombotic safety signal

Robles-Carrillo L et al. J Immunol 2010

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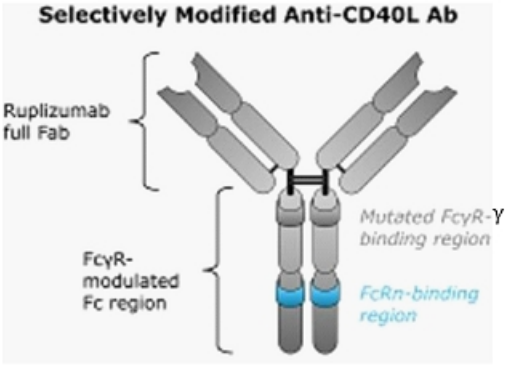
Emerging Costimulation Blockade: αCD154

TNX-1500: αCD154 IgG4 with retained hu5c8 Fab



- Aglycosyl IgG1 αCD154 Ab exhibits reduced efficacy in allo islet model (Ferrant et al 2004)
- FcγR silenced αCD154 domain Ab exhibits reduced efficacy in allo kidney model (Kim et al 2016)
- **TNX-1500 is an Fc-modified IgG4 αCD154 with reduced binding to FcγRIIa**

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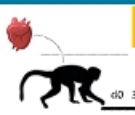
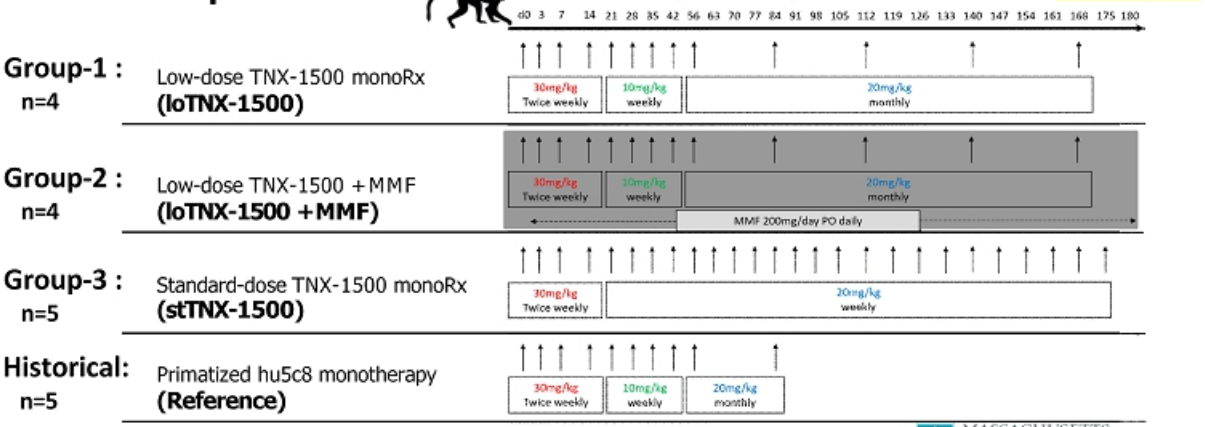
Emerging Costimulation Blockade: αCD154

Heterotopic abdominal heart allotransplant model



Protocol biopsies : POD ~45 and 90

EOS : POD 180



Group-1 : n=4	Low-dose TNX-1500 monoRx	**(loTNX-1500)**
Group-2 : n=4	Low-dose TNX-1500 + MMF	**(loTNX-1500 + MMF)**
Group-3 : n=5	Standard-dose TNX-1500 monoRx	**(stTNX-1500)**
Historical: n=5	Primatized hu5c8 monotherapy	**(Reference)**

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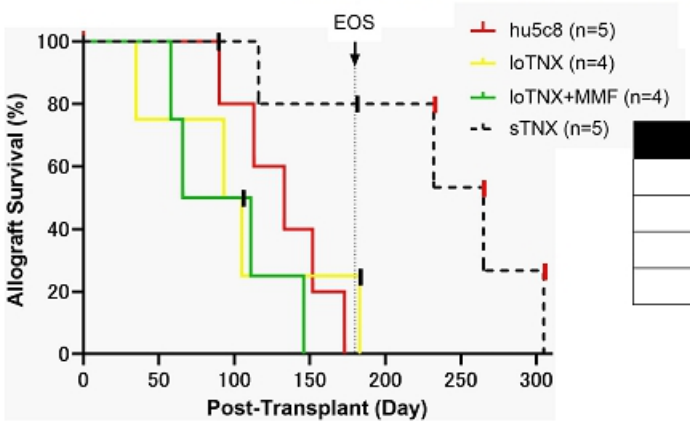
Emerging Costimulation Blockade: αCD154

Results - Heart Allograft Survival in NHPs is significantly prolonged with standard dose TNX-1500 (stTNX)



Explant of beating graft

Rejection after cessation of stTNX treatment

Treatment Group	MST (range)
hu5c8 (Rx off d90)	133 days (90-173)
loTNX	99 days (35-183)
loTNX + MMF	88 days (58-146)
stTNX	>265 days (116-305)

P<0.05 for all comparisons against stTNX

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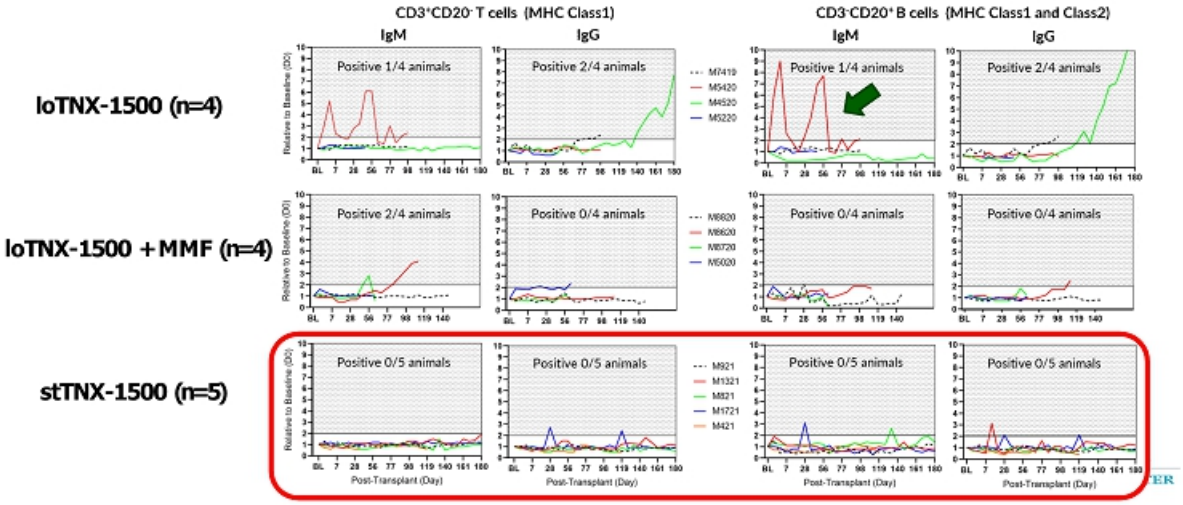
Emerging Costimulation Blockade: αCD154

Results-TNX-1500 suppresses anti-donor-alloantibody elaboration



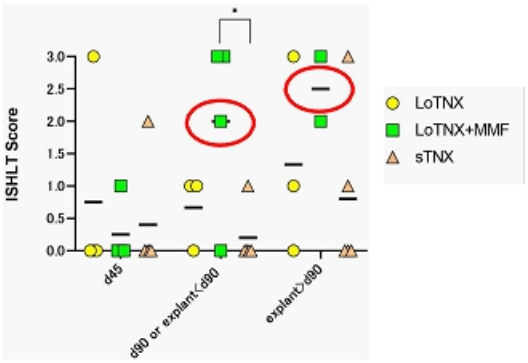
Emerging Costimulation Blockade: αCD154

Results- Immune Injury

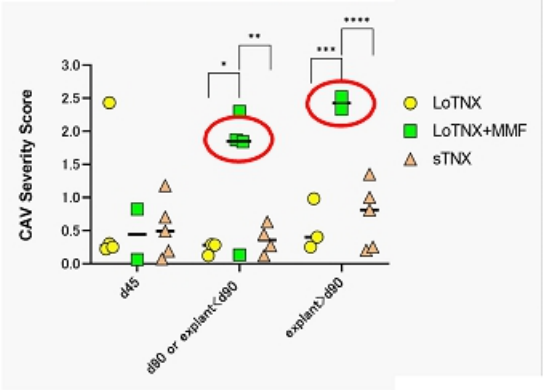
CAV significantly more severe with loTNX-1500+MMF

* P<0.05
** P<0.01
*** P<0.005
**** p<0.001

ISHLT scores



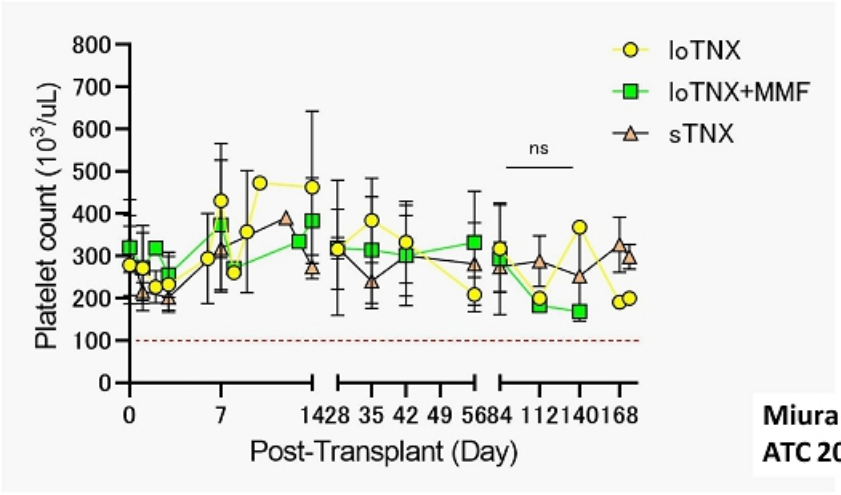
CAV severity scores



Emerging Costimulation Blockade: αCD154

Results- Platelet counts stable

No thromboembolic complications were observed

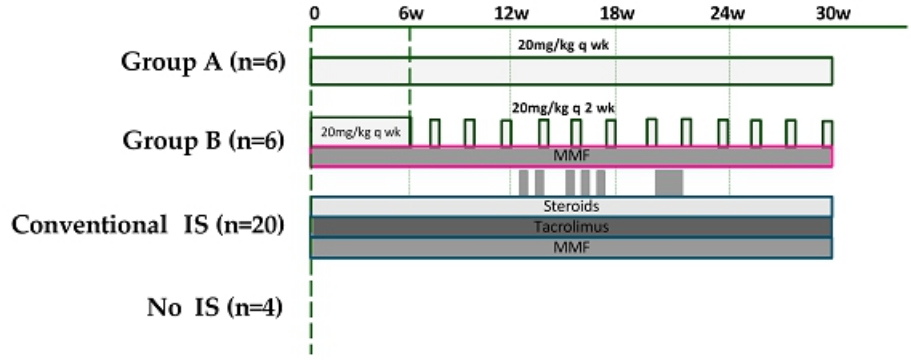


Miura S et al
ATC 2022, #582

Emerging Costimulation Blockade: αCD154

Lassiter G, Kawai T et al
ATC 2022, Abstract #172
Cyno Kidney AlloTxp

6 Standard Dose TNX-1500 (Group A)
6 Reduced-Dose TNX-1500+MMF (Group B)
Compared with Historical Results



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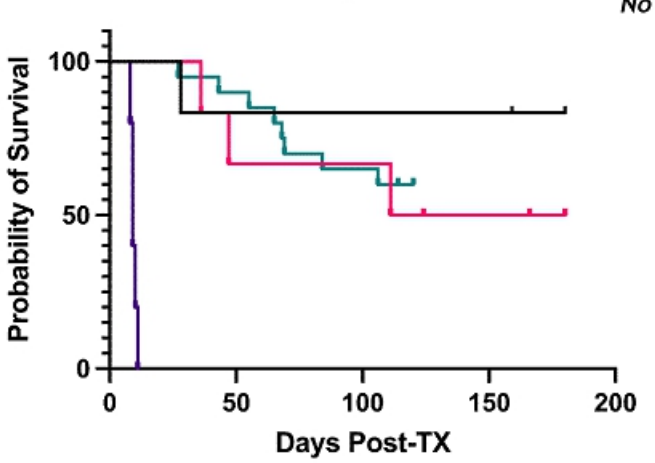
Emerging Costimulation Blockade: αCD154



TNX-1500 > loTNX-1500 + MMF

No thromboembolic complications were observed

- Group A (n=6) ***~stTNX***
- Group B (n=6) ***~loTNX+MMF***
- Conventional I.S. (n=20)
- No I.S. (n=4)

Lassiter G, Kawai T et al
ATC 2022, Abstract #172

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Emerging Costimulation Blockade: αCD154

Conclusions

- **Standard-dose TNX-1500 inhibits pathologic alloimmunity in NHPs**
  - **Consistently prolonged NHP cardiac and renal allograft survival**
    - *Relative expansion of Tregs in peripheral blood*
    - *No CMV activation (no prophylaxis)*
    - *No clinical thrombotic events.*
- **MMF does not improve heart results with low-dose TNX-1500**
  - **Similar findings for kidney**
    - *Does MMF interfere with Treg expansion, function under αCD154 Rx? (Kirk AD et al)*
- **TNX-1500 inhibits alloantibody elaboration, class switching**
  - **Dose-dependent effect**

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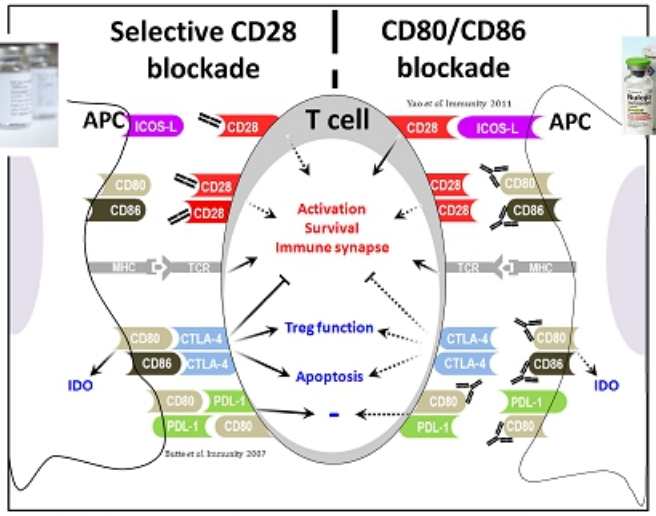
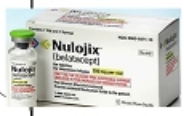
Emerging Costimulation Blockade : αCD28

αCD28

FR104:

domain-associated antibody, PEGylated





LEA29Y:

CTLA4-Ig

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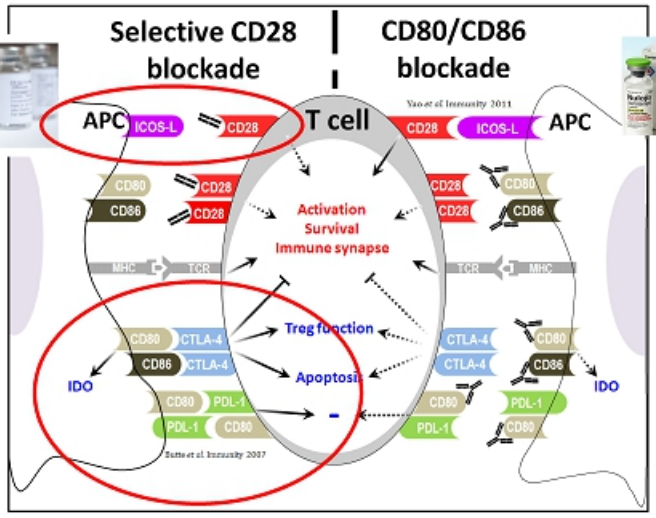
References: Poirier et al. Immunotherapy 2010; Transpl Int 2011; Am J Transplant 2012

Emerging Costimulation Blockade : αCD28

αCD28



FR104:

domain-associated antibody, PEGylated

LEA29Y:

CTLA4-Ig

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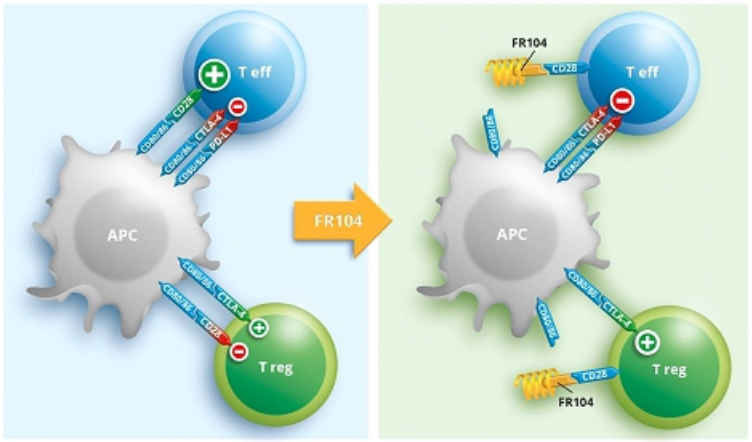
References: Poirier et al. Immunotherapy 2010; Transpl Int 2011; Am J Transplant 2012

Emerging Costimulation Blockade: αCD28



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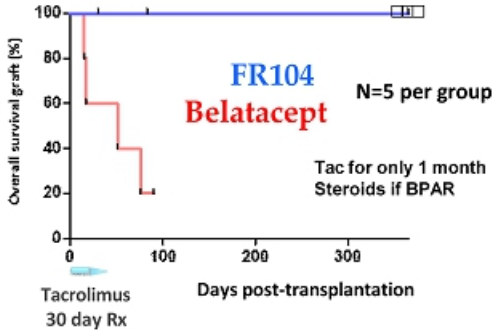
Emerging Costimulation Blockade: αCD28

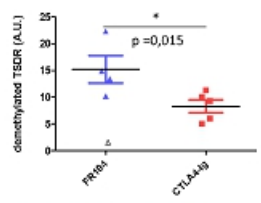
FR104 monoRx promotes baboon kidney allo-Tx survival

Superior control of graft rejection vs Belatacept (steroid-resistant)

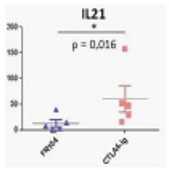


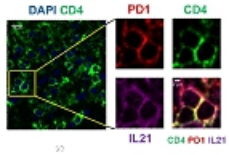
Ville, Poirier et al, J Am Soc Nephrol 2016
Poirier et al, Am J Transplant. 2015
Poirier et al, Science Transl Med 2010

Expanded intragraft Tregs



Better control of intragraft Tfh
(decrease in IL-21 secreting cells)





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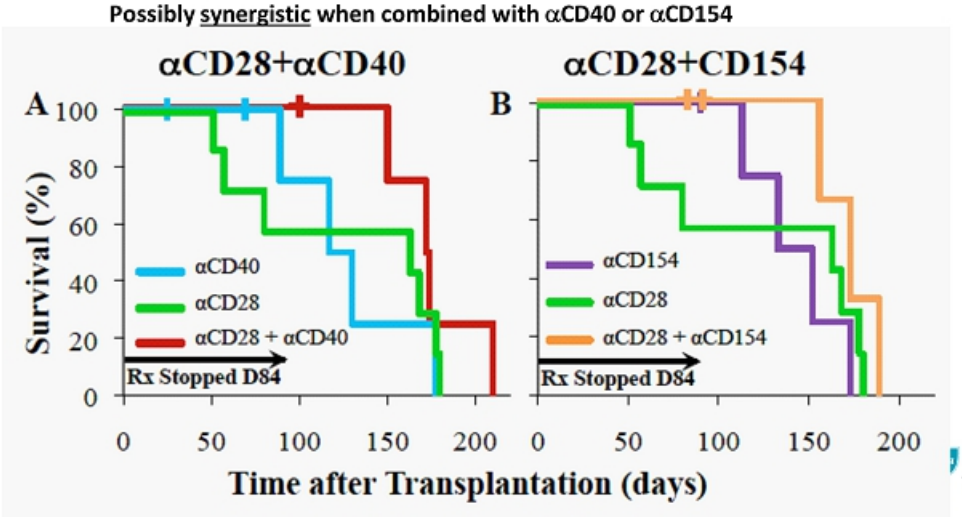
Emerging Costimulation Blockade: αCD28

FR104 Rx promotes monkey heart allo-Tx survival

Possibly synergistic when combined with αCD40 or αCD154



N=5-7 per group
Rx stopped after d84
No viral illness (no Rx)

Azimzadeh, Pierson, unpublished

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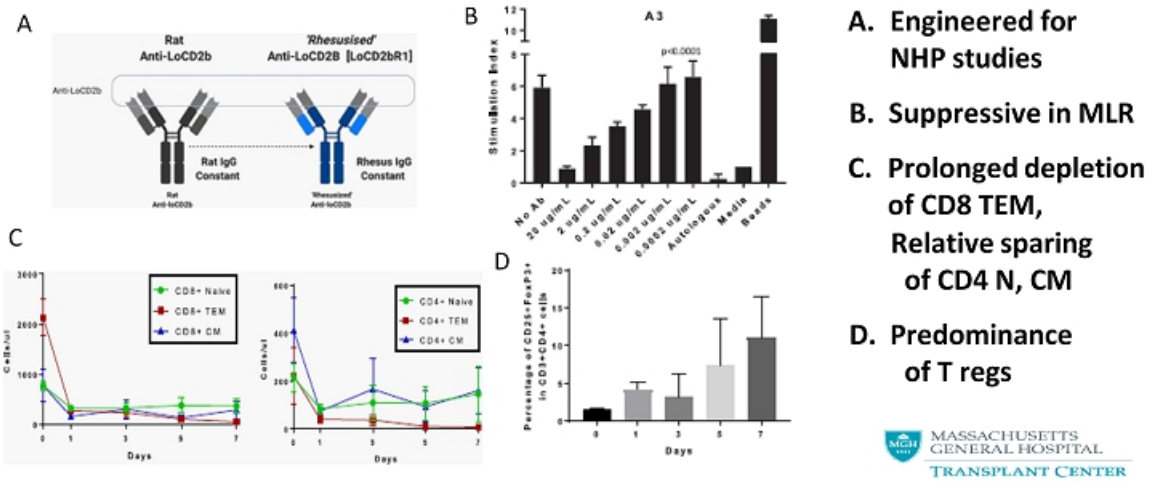
Emerging Costimulation Blockade: αCD2

CD2: α-loCD2 to replace αCD8 for tolerance induction in NHP



A. Engineered for NHP studies

B. Suppressive in MLR

C. Prolonged depletion of CD8 TEM, Relative sparing of CD4 N, CM

D. Predominance of T regs

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Emerging Costimulation Blockade Approaches

CD154

Tonix emphasizing transplantation (allo, xeno) for TNX-1500

Phase 1 targeted for 2022 pending IND approval

CD28

OSE/Veloxis in Phase 2 for kidney transplantation with FR104

"Encouraging so far…"

CD2

Primatized αloCD2 effective in kidney tolerance model

Siplizumab for human kidney tolerance: in progress (MGH)

"Encouraging so far…"

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Emerging Costimulation Blockade Approaches

Thank you

for your attention!

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