........... it’s a long story

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Kawasaki Disease

- Febrile vasculitis (inflamed blood vessels) with a predisposition for the coronary arteries → **untreated coronary artery aneurysm rate of 20%**

- Typically seen in **children** 0.5 to 6 years of age

- Diagnosed based on prolonged fever (5 days) plus 4 of 5 possible findings on physical exam.

- Looks like a viral illness and easily **missed** by pediatricians. **2/3rds of cases in the U.S. go undiagnosed.** Causes significant acute and delayed cardiac morbidity and mortality. ~6000 diagnosed cases per year in the US.

- **Treatment:** Hospitalize and give pooled human gamma globulin (antibodies), $$$

- **NEED:** Rapid diagnostic test for a dangerous illness to guide an expensive therapeutic decision
Pediatric Kawasaki Disease and Adult Human Immunodeficiency Virus Kawasaki-Like Syndrome Are Likely the Same Malady

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POC Screening test for Kawasaki Disease (KD):

- **sTNFRII < 1900 pg/ml** = Not KD
  
  “This is likely a viral infection that will go away on its own. Ok to go home and follow up with your pediatrician or family practice doctor.”

- **sTNFRII > 1900 pg/ml** – serious medical event - admit to hospital and finish fever evaluation, consider Kawasaki Disease.

Viral infections are about interferons

Bacterial infections and KD are about TNFα

KD includes blood vessel inflammation (vascular chemokines).
Febrile Child sTNFR2 POC Test
more than a Kawasaki Disease Screening Test

• Rapidly rules out serious inflammatory events (need for admission) to simplify febrile child ER workflows
• Identifies children who may have KD for additional evaluation
• The market is febrile children in emergency rooms and primary care clinics:
  • Fever is the #1 complaint in pediatric emergency rooms representing 5 million visits annually in the relevant age group.
  • “Fever” accounts for 30% of outpatient pediatric clinic visits, 70 million visits annually.
Technology barrier = lack of antibody pairs for capture-detection for a POC test

Phase I STTR: Developing a point-of-care test to Diagnose Kawasaki Disease R41HD093473

Result: New noncompeting rat anti-human monoclonal antibodies to sTNFRII
**Phase I STTR:** Developing a point-of-care test to Diagnose Kawasaki Disease

**Product #1** CLIA-certifiable sTNFR2 ELISA

**Product #2** sTNFR2 POC test- prototype device
No known competitors in the public domain for either the sTNFR2 ELISA or POC test. Monoclonal antibody barrier to new entrants who otherwise have the technologic skillset.

**Relevant comparator/competitor is the procalcitonin test (Procal).** FDA indication to initiate or discontinue IV antibiotics for lower respiratory tract infections and discontinue antibiotics in sepsis. Poor performer for KD. $70 per test $700 million in annual revenue combining children and adults.

**Revenue stream:**

1) **sTNFR2 POC test:** 20% adoption rate by Emergency Rooms would be 1 million tests annually x $70 = 70 million. Anticipate 20% per year growth as testing migrates into the outpatient clinic setting.

2) **Vascular chemokine POC test** to complete KD diagnostic algorithm

3) **sTNFR2 ELISA:** Distribute through 3rd party vendor or run as a laboratory developed test (LDT).

**Pipeline:** Therapeutic anti-inflammatory monoclonal antibodies (humanized) in preclinical development. Vascular chemokine ELISAs.

**Intellectual property:** Johnson, Yale; U.S. Application No. 63/423,223, filed 7 November 2022; TNFR2 Antibodies and Methods of Using the Same

**Investors:** Raymond Johnson, senior executive at Johnson & Johnson (therapeutic development leader), a nephrologist, and a business consultant. Yale owns 10% of common stock.
The Team:

• Acting CEO: **Raymond M. Johnson**, M.D., Ph.D., Associate Professor Medicine, Infectious Diseases, Microbial Pathogenesis at Yale University.

• CEO in waiting (01/01/2024): **Sigmond G. Johnson**, Ph.D., M.B.A. currently senior executive at Johnson & Johnson (therapeutic development leader). Managed development and FDA approval of Xarelto.

• Lead Academic Investigator: **Kelly Bergmann, D.O.,** M.S. Director of Emergency Medicine Research at Children’s Minnesota Hospitals in Minneapolis, MN (University of Minnesota)

• GMP manufacturing and lateral flow development partner: **nanoComposix**, San Diego, CA

Immunodiagnostics milestones:

**Phase II R42 STTR grant renewal submitted April 5th - $2 million over 2.5 years**

- FDA-approval of sTNFR2 ELISA........ within 2 years
- Phase III trial and FDA approval of the sTNFR2 POC device....... within 4 years
- Phase III trial and FDA approval of the vascular chemokine POC device within 6 years

Laboratory: Laboratory space in Biolabs New Haven beginning June 1st (today).