Theme 3: Engineer and allocate better grafts

OCTOBER 15-16, 2019
BANFF, ALBERTA

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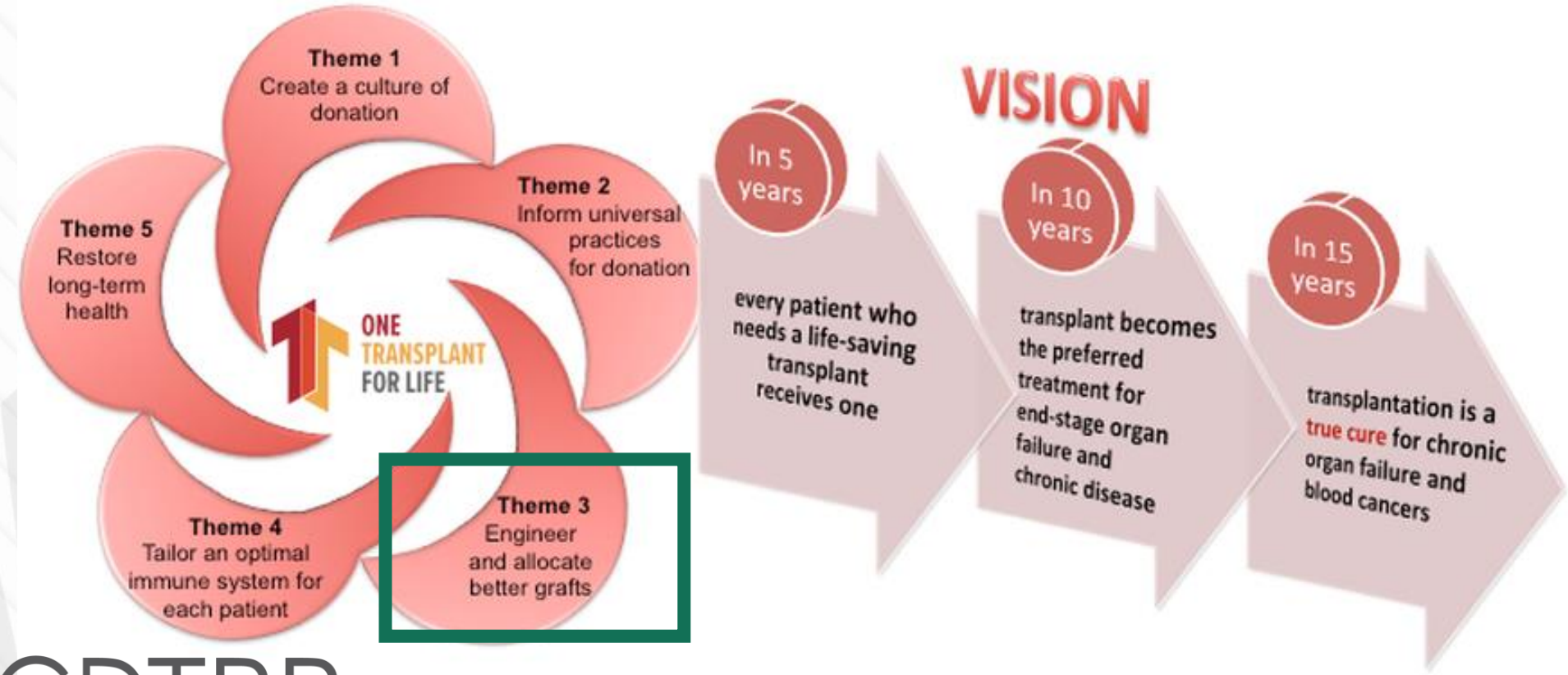

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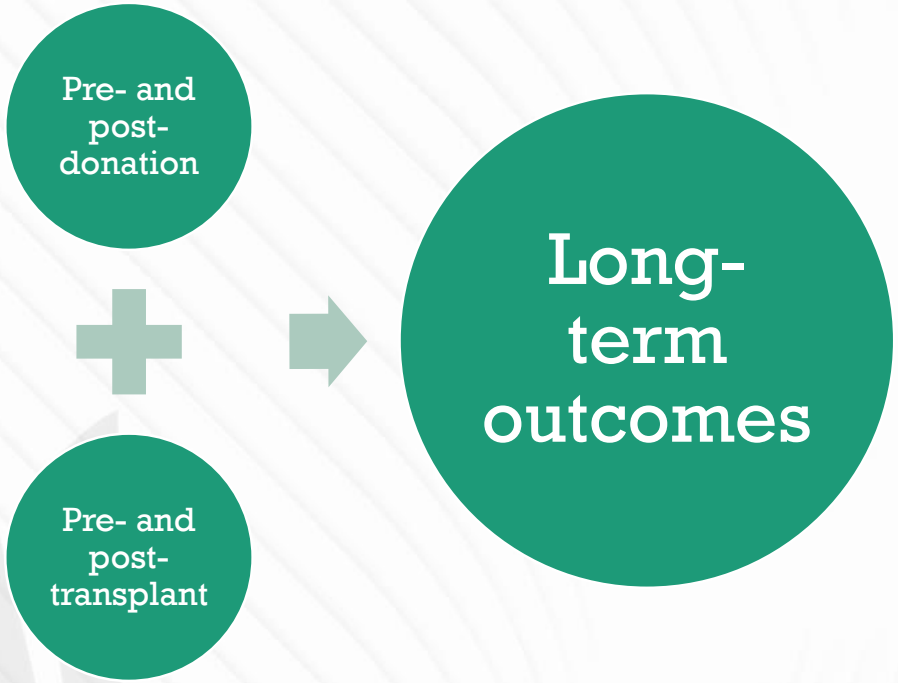
Theme 3: At a glance



- A better graft = better long-term outcomes
- Impact on patients:
  - Post-operative recovery
  - Quality of life
  - Transplant longevity

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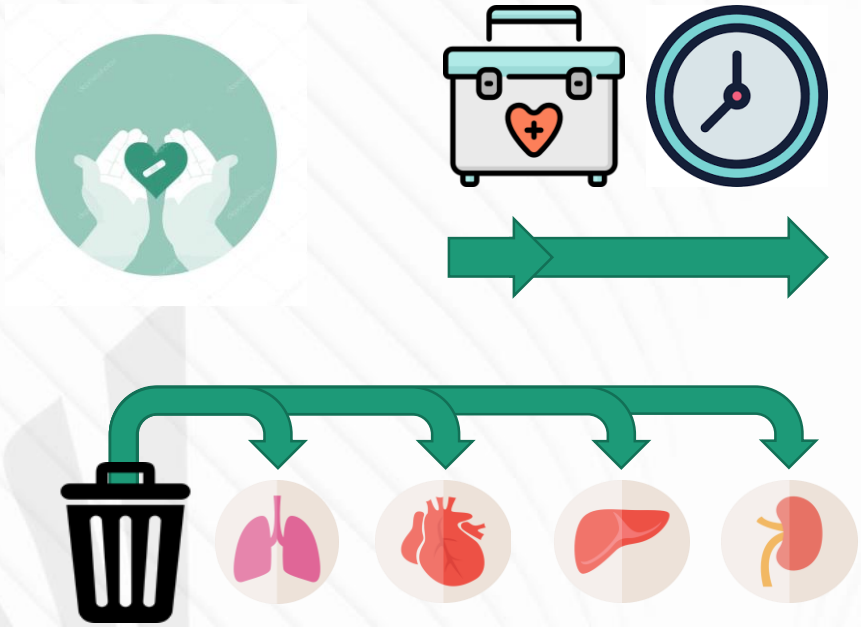
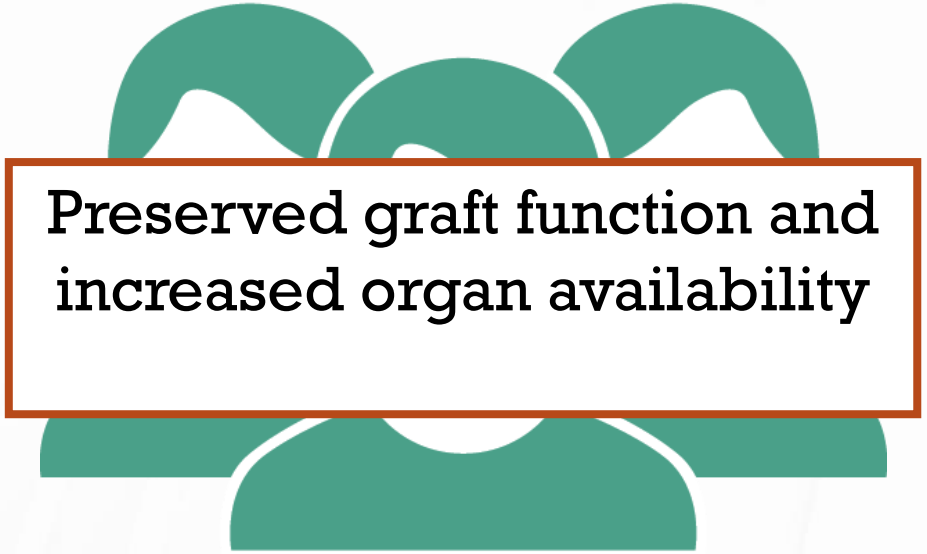
Ex-vivo organ perfusion treatment and assessment

The Science



The Patient



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Assessment of tissue damage and impact on transplant outcomes

The Science

The Patient

Improved prediction of what could happen to the transplanted organ → prepare for or potentially prevent harm?

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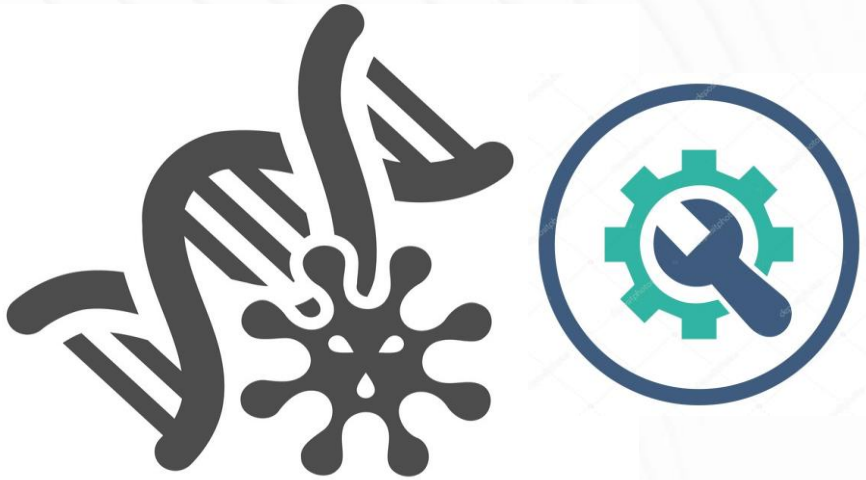
Graft Engineering

The Science



The Patient

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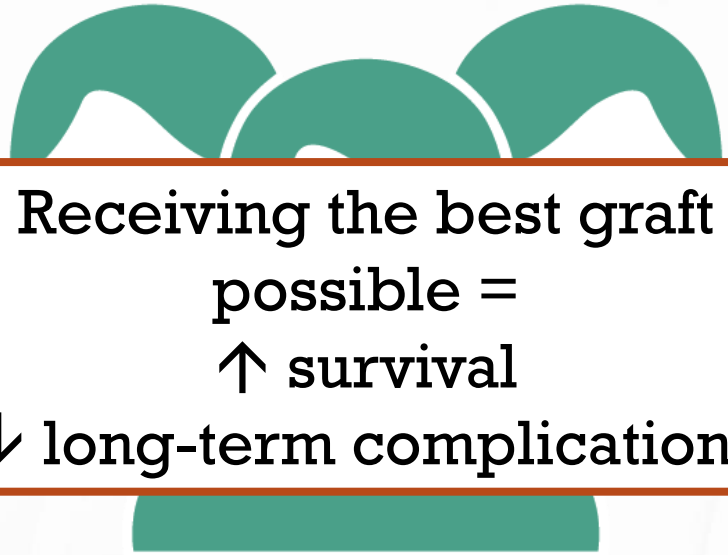
Graft Allocation

The Science

The Patient



Receiving the best graft possible =
↑ survival
↓ long-term complications

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SIGNATURE PROJECT DIRECTIONS

- Viruses and antiviral strategies in donation
- Delivery of ex-vivo therapeutics
- Study of tissue injury and consequences on the transplant process

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Where are we at ?

- What have we accomplished? What are our strengths?
- What should we bet on?
- What opportunities are there?

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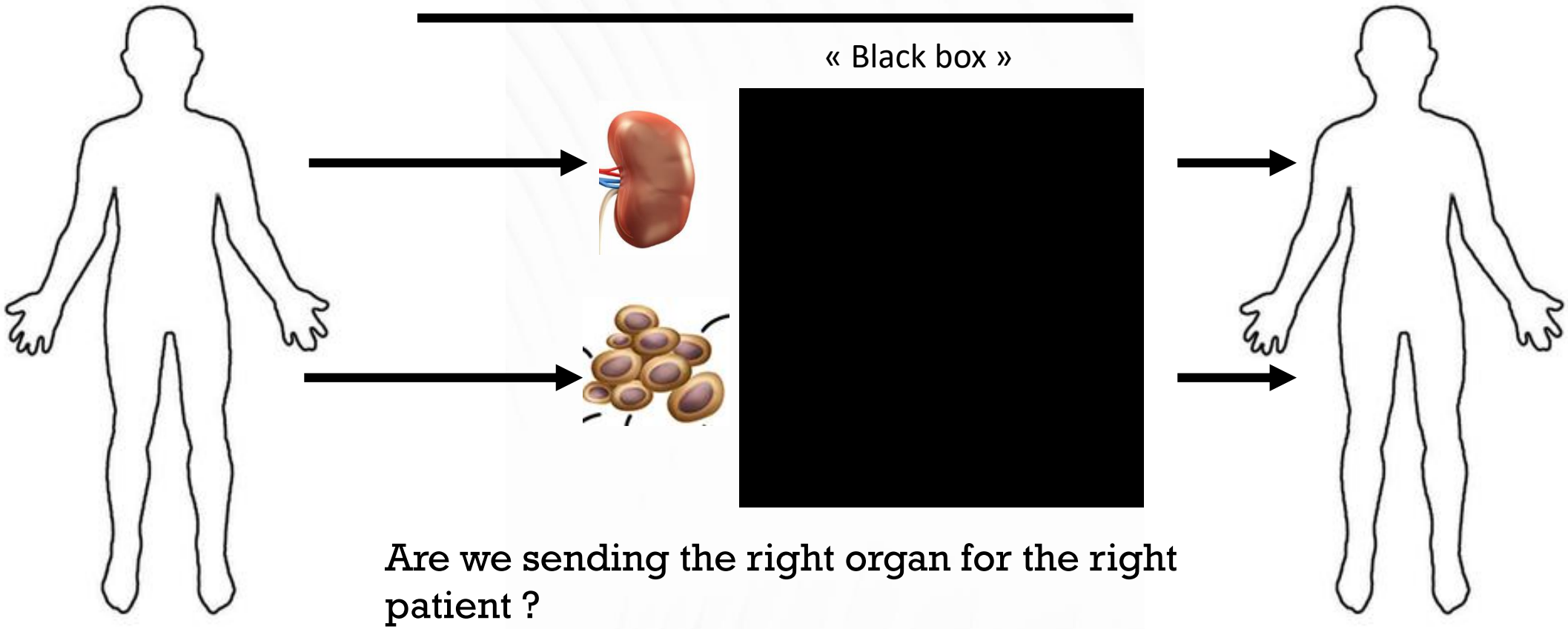
The transplant procedure



Are we sending the right organ for the right patient ?
Can organ allocation be based on rational grounds?

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Foundation research within the CNTRP – T3 signature projects within the CDTRP

Large contingent of T3 investigators focusing on basic sciences – inflammatory/immune reaction
→ *Associated area of biomarker research being developed*

Highly innovative ex-vivo organ handling/manipulation research

Strong translational capacity and interest in cell engineering and cellular therapy

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T3 Innovation projects within the CDTRP

- **M. Selzner:** "Indocyanine Green (ICG) Fluorescence imaging during Normothermic Ex Vivo Liver Perfusion (NEVLP) in swine model of Donation after Cardio-circulatory Death (DCD)"
- **D. Kumar:** "Ex-vivo Delivery of Rituximab to Prevent PTLD in EBV mismatch Lung Transplant Recipients: A Pilot Trial"
- **A. Murray:** "Apelin receptor signaling and lymphocyte function in allograft rejection"
- **A. Halpin:** "Knowing the unknown: adding an HLA-specific memory B cell assay to the toolbox."
- **M. Liu:** "Cystic fibrosis and donor specific injuries in human lung transplants: a comprehensive bioinformatics and systems biology approach"
- **E. Brochiero:** "From the donor to the recipient: Identification of novel biomarkers and therapeutic targets associated with primary graft dysfunction after lung transplantation"

Leads for the future

- « Think big » approach – aim for transformative innovations

  → *New Frontier Program*

- Extensive organ manipulation (ex vivo treatment)

  → *More and better organs*

- Cell therapy, engineering

  → *Tolerization, specific immunotherapy*

- Leverage the unique strengths of the CDTRP (convergence of donation, bone marrow transplantation and organ transplantation)

  → *Devise new combined organ/stem cell transplantation*

Interactions with other themes

- T2 Donor interventions
- T4 Design of optimal immune systems
- T5 Long term outcomes

Need to implement a biomarker stream across the entire program

Will inform how to « engineer » the transplant procedure

Will assess the quality of the interventions