# Enabling Robotic Multi-Bypass Coronary Surgery
## *Stepwise Preclinical Validation of a Sutureless Connector*

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**WHY THIS MATTERS (Problem)**

- Robotic CABG adoption remains limited
- **Distal anastomosis = main bottleneck**
- Multi-bypass in closed chest = highly complex

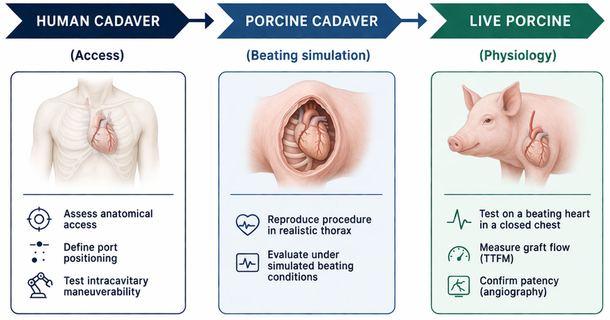
👉 ***We need reproducible, simplified anastomosis***

## OUR APPROACH (Innovation)

- **Sutureless coronary connector**
- **Stepwise validation strategy**

| Model | Purpose | Outcome |
|---|---|---|
| **Human** | Access | Feasibility |
| **Porcine cadaver** | Simulation | Reproducibility |
| **Live** | Physiology | Flow & patency |

**STEPWISE PRECLINICAL VALIDATION STRATEGY**

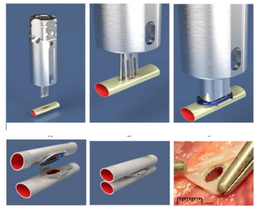



**Bridging bench → real physiology**

## METHODS

**Platform:** Robotic
**Models:** Human → Porcine → Live
**Endpoints:**

- Feasibility
- Leakage
- Flow (TTFM)
- Patency (angiography)
- Usability



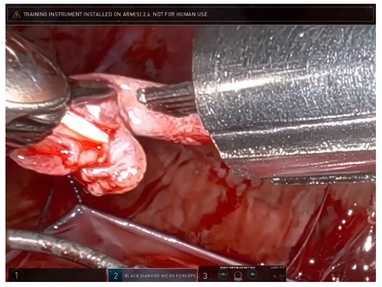
## RESULTS

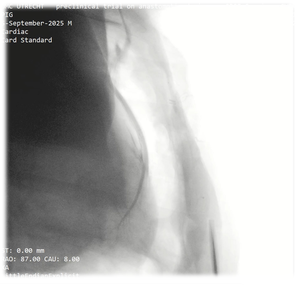
- **8 total anastomoses (6 ex vivo, 2 in vivo)**

| Model | Anastomotic Configurations |
|---|---|
| **Human** | LIMA–LAD · fRIMA–LIMA · fRIMA–OM |
| **Porcine cadaver** | LIMA–LAD · fRIMA–LIMA · fRIMA–OM |
| **Live** | LIMA-fRIMA - LIMA–LAD |

- **100% SUCCESS**
- **0 LEAKS**
- **PATENT ANASTOMOSES**
- Adequate flow (TTFM)
- Angiographic patency
- Reliable sealing (tissue–metal coaptation)
- Usability: **4–5 / 5**
- Acceptable deployment time

👉 ***Reproducible across all models***





**From feasibility → reproducibility → physiology**

## CONCLUSIONS

- **Robotic multi-bypass is feasible and reproducible**
- **Stepwise validation provides a translational pathway to clinical adoption**

👉 **A key step toward scalable robotic coronary surgery**