



Uncovering the Molecular Pathways in Iatrogenic Tracheal Stenosis: One Step Closer to Molecular Medicine



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Introduction

- **Iatrogenic tracheal stenosis (ITS)** may occur in up to **20%** of patients after **prolonged intubation**.
- Management is mainly **interventional**, with options including **tracheal resection & reconstruction**, **bronchoscopic dilation**, **laser therapy**, **spray cryotherapy** or **airway stent placement**.
- **Adjunctive medical therapies** to **consolidate the benefit of surgery** have been explored, but with **limited success**.

Objective

- To characterize **gene expression patterns** in **granulation tissue** of patients with **ITS**.

Methods

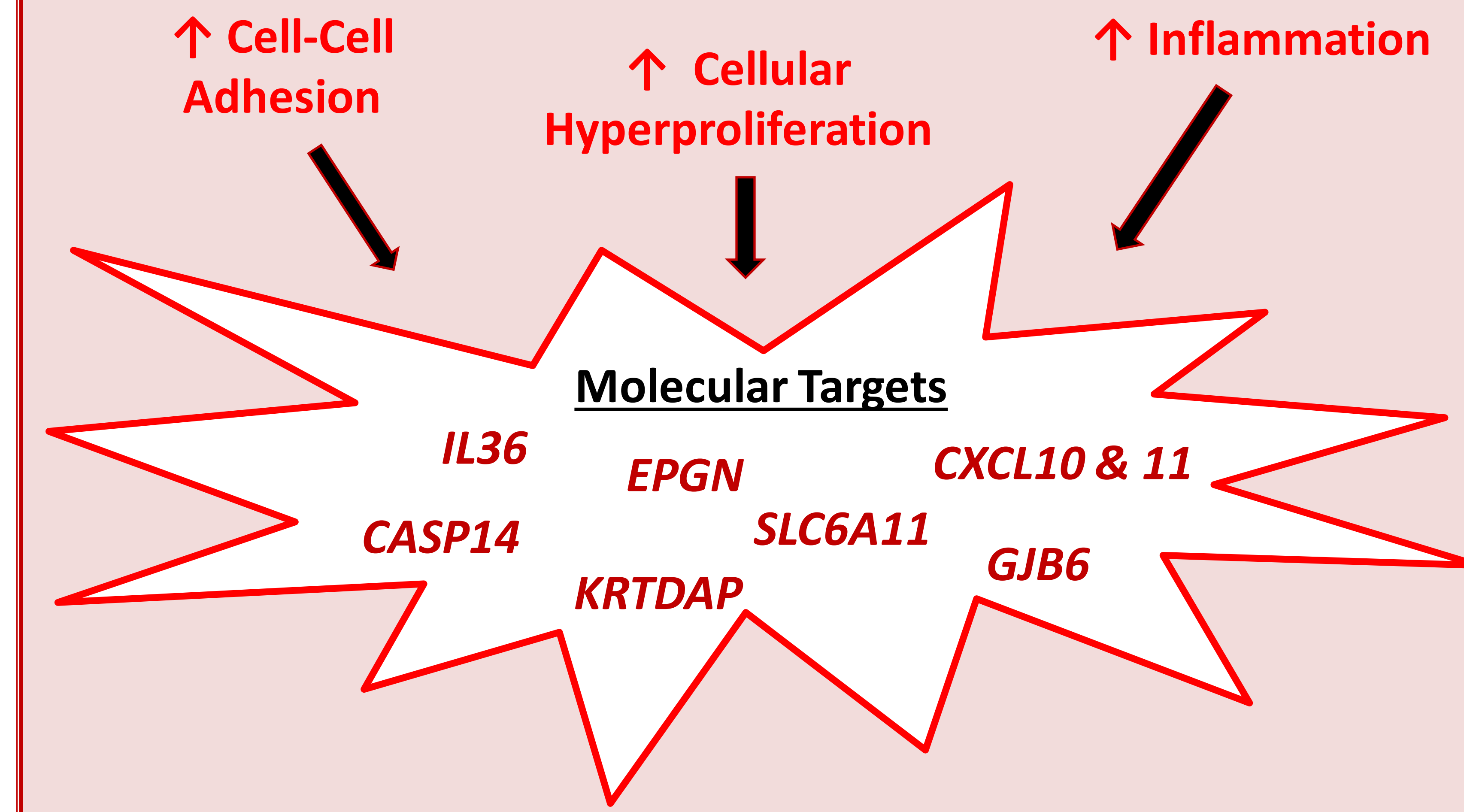
- **Tissue Sampling:** Biopsies of granulation tissue were collected longitudinally from **two patients** with **severe ITS**, with tracheostomies.
- Samples were taken **immediately prior to endoscopic balloon dilation & spray cryotherapy, 4-6 weeks apart**.
- **Tissue RNA Sequencing:** Using Illumina HiSeq
- **Gene Expression Analysis:** CLC Genomics (Qiagen)
- **Functional Annotations:** DAVID platform/KEGG pathways

Results

Patient 1 (Poor Responder)

- **Clinical Course:** **Redeveloped severe tracheal stenosis** after both endoscopic treatments, necessitating **continued indwelling tracheostomy tube**.

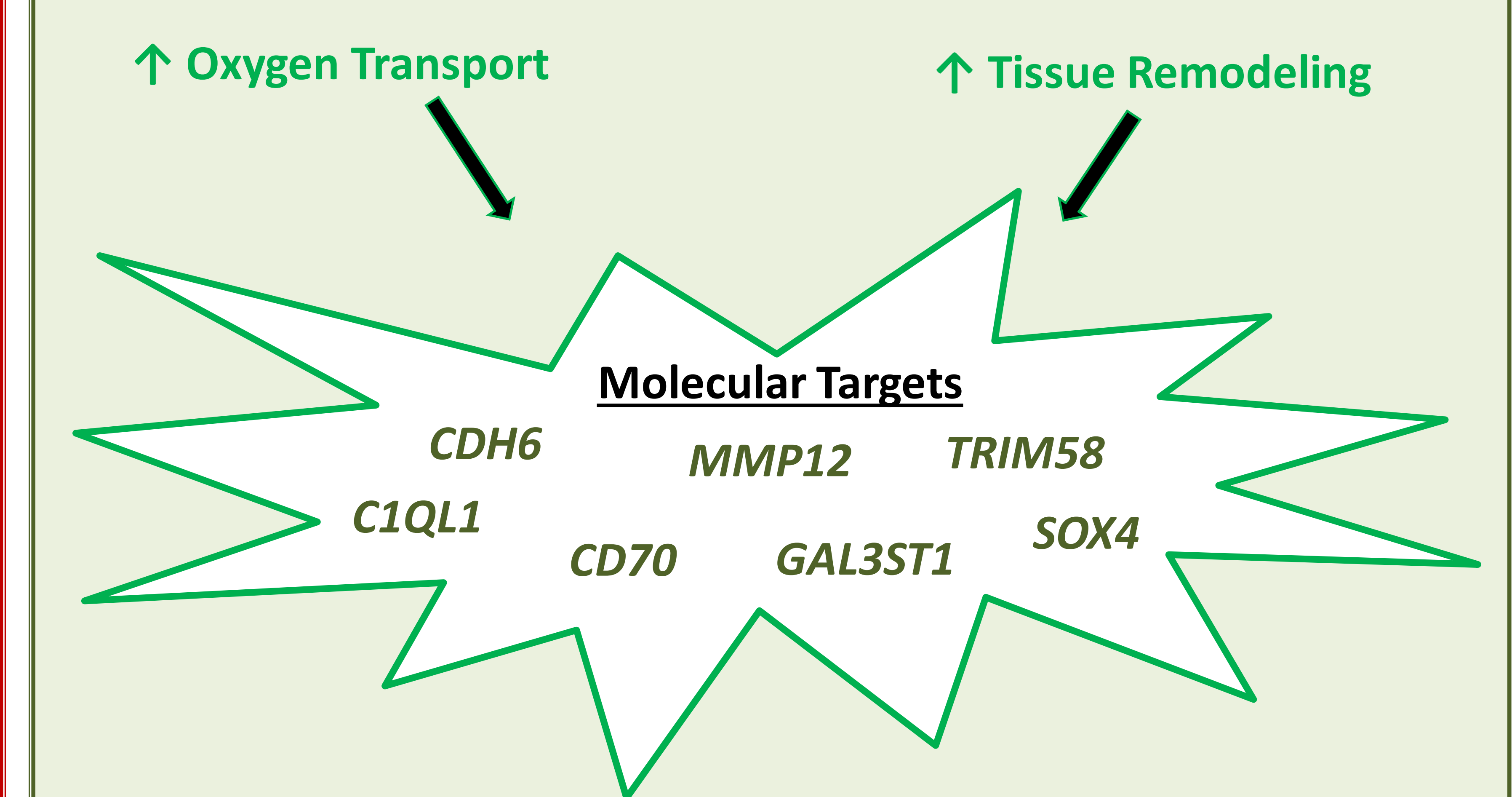
Molecular Pathways & Targets



Patient 2 (Partial Responder)

- **Clinical Course:** **Redeveloped mild tracheal stenosis** after **first endoscopic intervention**, with adequate airway patency to allow for **airway decannulation**.

Molecular Pathways & Targets



Conclusion

- **Treatment non-response** in ITS is characterized by **molecular profiles** of **dysregulated tissue growth** and **inflammatory response**, with **distinct molecular signatures unique to the clinical course** of each patient.
- This opens avenues to the **multimodal management of ITS**, with a combination of **endoscopic treatment** and **novel, personalized biologics targeting key molecular pathways**.