Plasma Physics Laboratory (LPP*) UMR 7648,
CNRS - Ecole Polytechnique - Sorbonne -
INSERM - APHP

Endoplas (Cathaplas)

#MedTech #ColdPlasma #Endoscopy

INSTITUT POLYTECHNIQUE DE PARIS

THE PROBLEM ADDRESSED

ENDOPLAS is a **cold plasma catheter** designed for endoscopic treatment of **solid tumors**, particularly biliary tract cancers (BTC).

Current treatments such as tumor resection and systemic chemotherapy are often ineffective for inoperable patients. This innovative, **minimally invasive** alternative could improve patient outcomes and expand therapeutic options.

Developed at the Laboratory of Plasma Physics (LPP), this project stems from interdisciplinary collaboration with biologists and medical endoscopist from **St Antoine's hospital (Paris)**.

Our team combines expertise in plasma physics, biomedical applications, and endoscopic interventions, making us **uniquely positioned worldwide** to develop this technology.

TECHNOLOGY

- **Cold plasma endoscopy** enables the local treatment of tumors in narrow body cavities. The catheter delivers controlled cold plasma to tumor sites, killing cancer cells. This method contrasts with traditional treatments like chemotherapy, radiofrequency ablation and PDT, which can cause collateral damage.
- **Key tools & Parameters:**
  - High-voltage nano-pulsed cold plasma.
  - Designed to fit standard duodenoscopes.
  - Preclinical validation in physical models and in vivo environments.

COMPETITIVE ADVANTAGES

- **Minimally invasive:** Reduces tissue damage and recovery time.
- **Targeted therapy:** Selectively attacks tumor cells.
- **Cost-effective:** Estimated production cost of €2.15 per catheter.
- **Clinically viable:** TRL 5 with preclinical success in porcine models.
- **Scalable application:** Potentially applicable to other endoscopic cancer treatments.

APPLICATIONS

- **TRL 5 - Preclinical stage:**
  - Treatment of BTC
  - Feasibility study done on porcine models.
- **Future development:**
  - Lung & gastrointestinal tract cancers
  - First clinical trials planned in 2027

DEVELOPMENT STATUS

- **TRL**: 5 (Validated in preclinical studies, advancing towards clinical trials).
- **Available products/services:**
  - Cold plasma catheter prototypes for testing.
  - Collaboration for further clinical validation.

INTELLECTUAL PROPERTY

- **Patent:** WO2022229515 (2022)
- **Additional patents:** Pending applications in Europe and the U.S.
- **Licensing opportunities:** Open for discussion with industry partners

INVENTORS & CONTACTS

- **Main inventors:** T. Dufour, L. Fouassier, M. Camus
- **Scientific lead:** thierry.dufour@lpp.polytechnique.fr
- **Key partners:**
  - LPP (CNRS, Sorbonne Université, Polytechnique)
  - CRSA (**Sorbonne Université**, INSERM, Saint-Antoine Hospital)
  - Assistance Publique - Hôpitaux de Paris (AP-HP)

PUBLICATIONS

- https://www.doi.org/10.1088/1361-6463/ac8c4d
- https://www.doi.org/10.3390/cancers12051280

LOOKING FOR

- **Co-development partners** to advance clinical validation and certification.
- **Investors** for startup creation & market expansion.
- **Healthcare institutions** for pilot studies & adoption
- **Industry partnerships:** manufacturing/distribution