

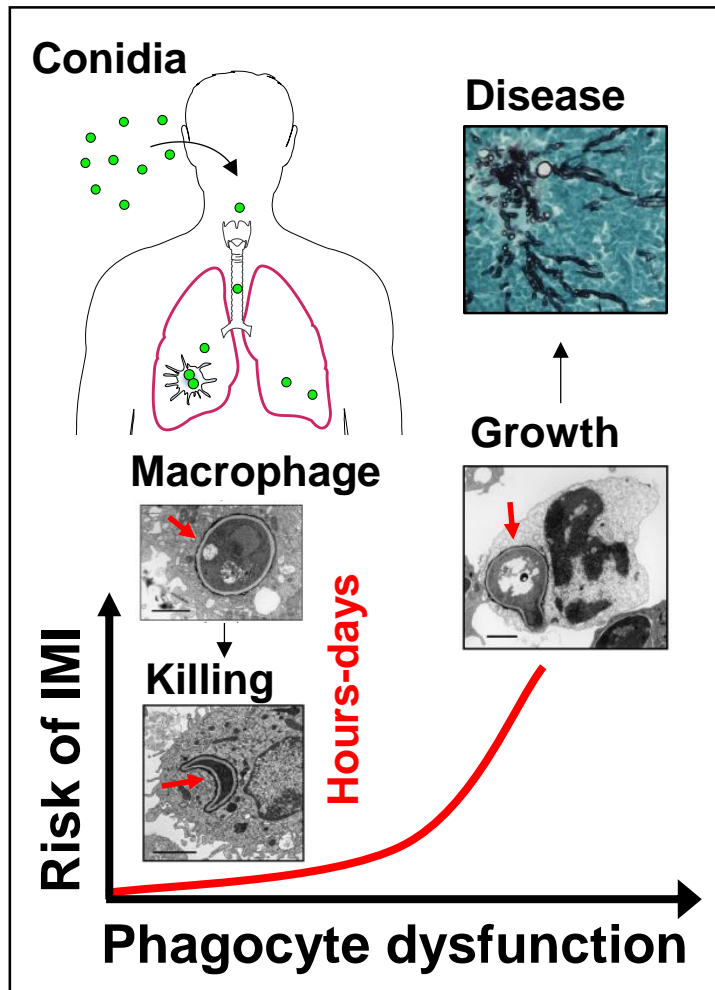
Fungal Immunology Group

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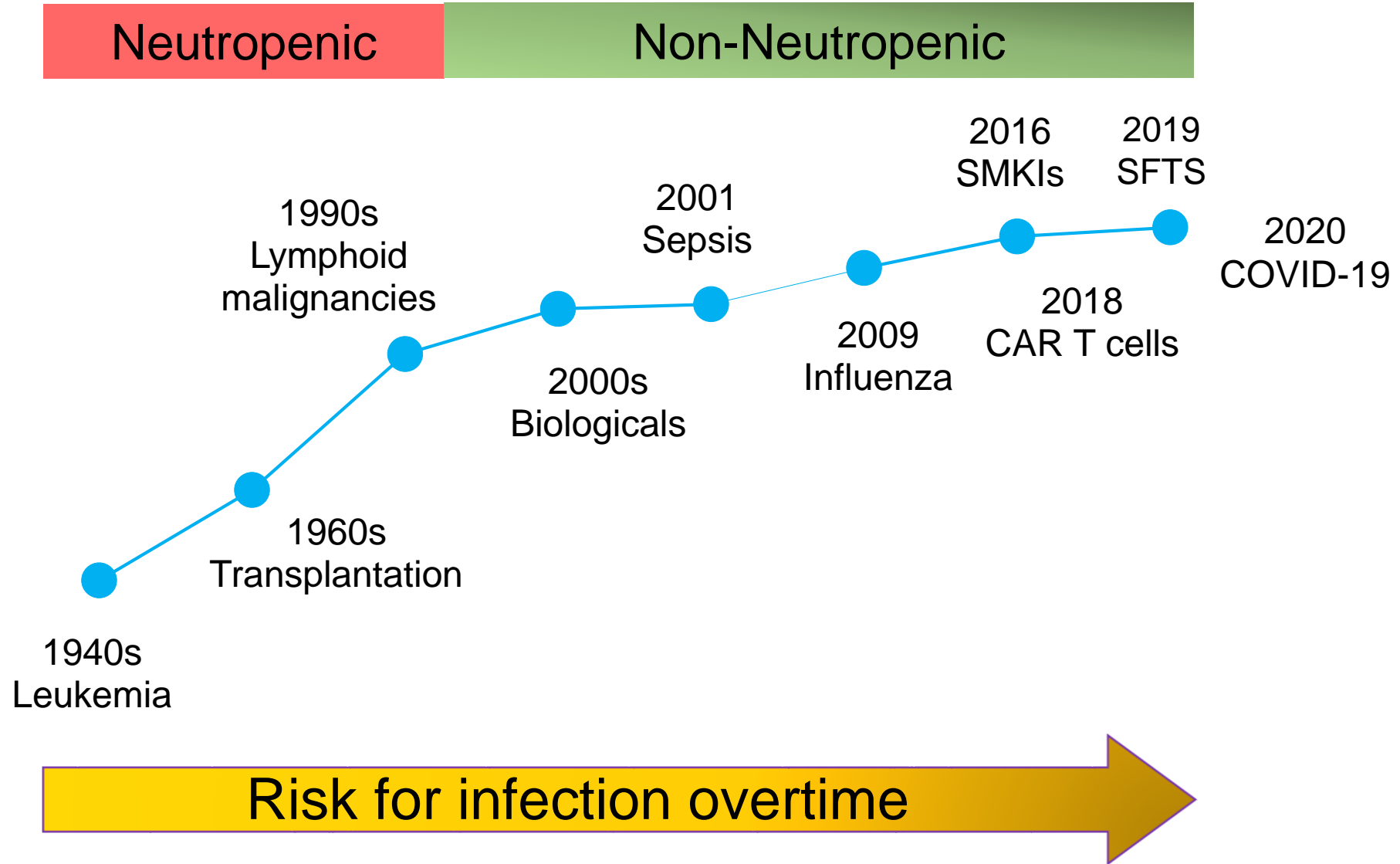
Invasive mold infections (IMI): **emerging** and **underestimated** human diseases



- ***Aspergillus*** and **Mucorales** fungi
- **400,000** pts/year, > **50%** mortality, **\$2 billion** annual cost (US), **evolving** epidemiology
- Patients with mold infection display complex **immunometabolic defects**

The pathobiology of invasive mold infections is incompletely understood

The evolving epidemiology of IMIs

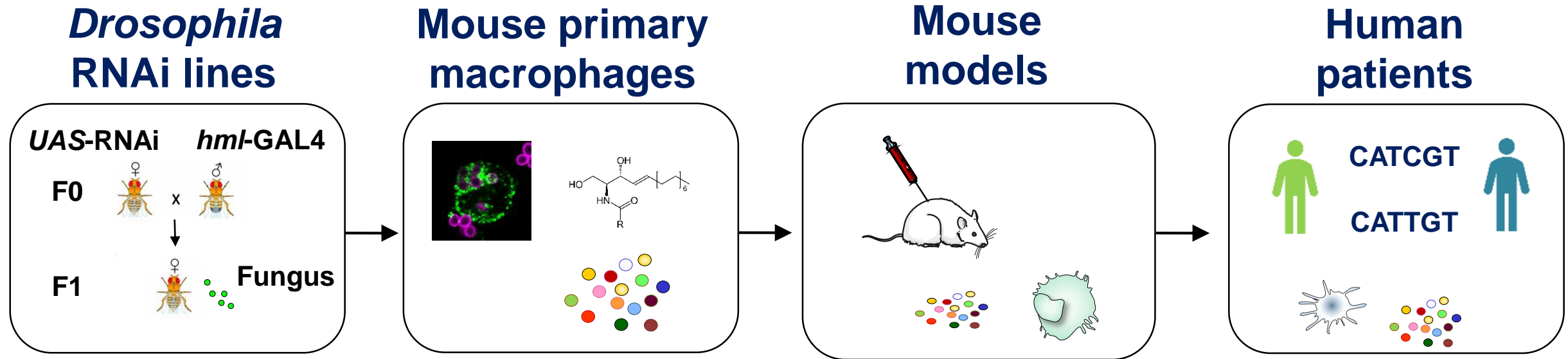


Our research approach

Using **molds as model pathogens**:

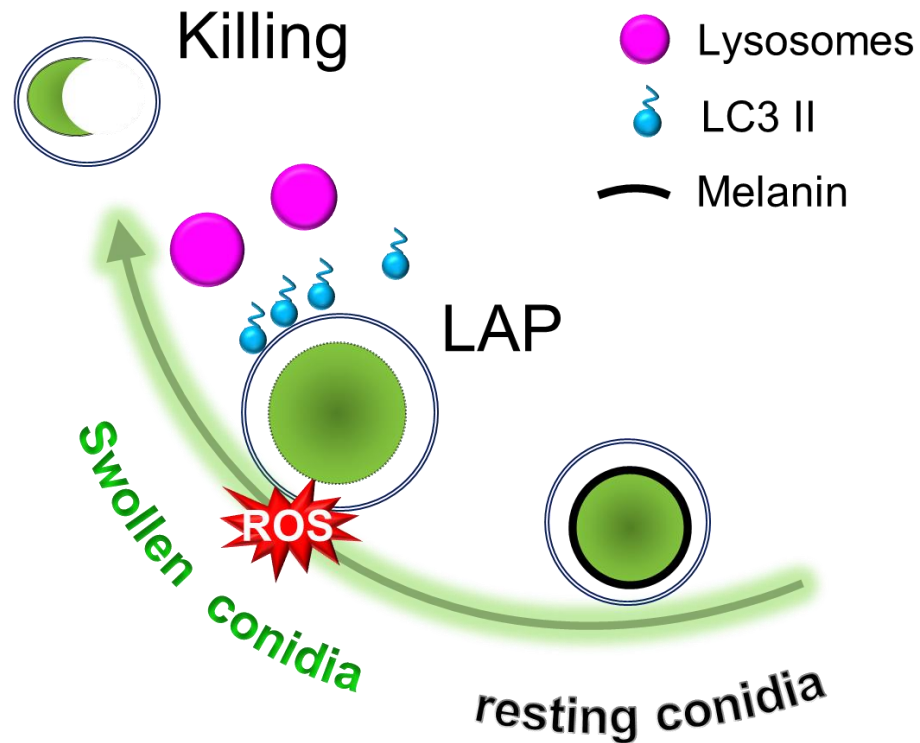
- ❑ Study **physiological immunity in phagocytes**
- ❑ Delineate mechanisms of **disease pathogenesis**
- ❑ **Translational directions**:
 - i. Identify **biomarkers** of phagocyte dysfunction
 - ii. Explore targeted **host-directed therapies**

Our experimental strategy



Novel Regulators of Phagocyte Immunity

LC3-associated phagocytosis (LAP), a specialized autophagy pathway, orchestrates antifungal immunity



Kyrmizi..., and Chamilos *J Immunol* **2013**

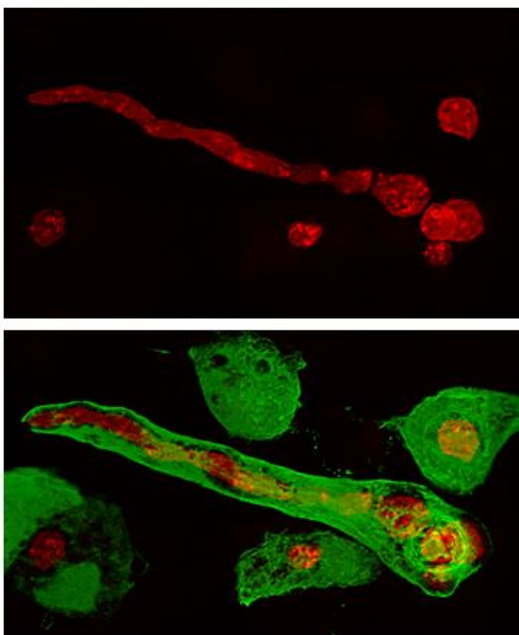
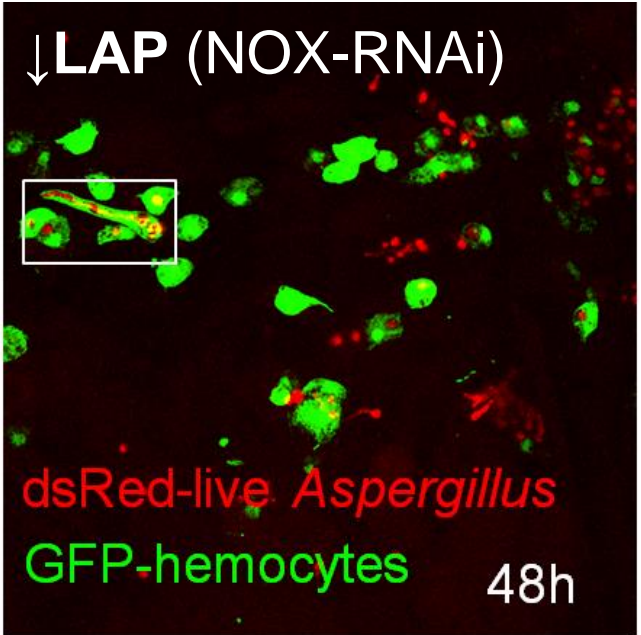
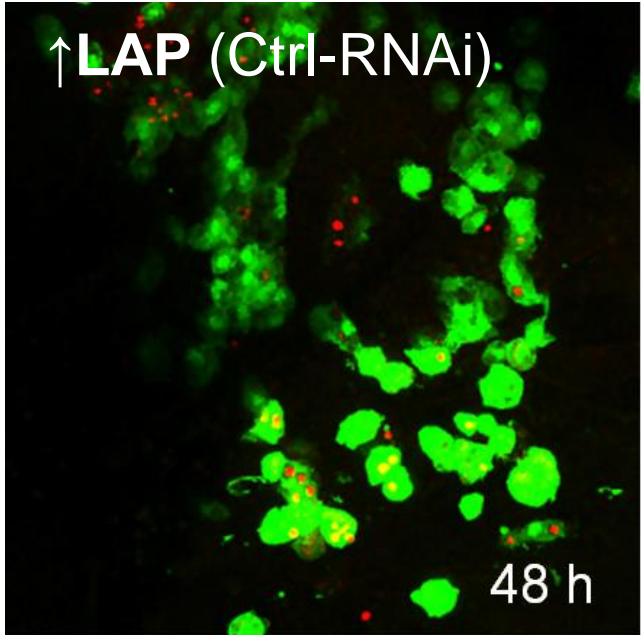
Akoumianaki..., and Chamilos *Cell Host Microbe* **2016**

Kyrmizi..., and Chamilos *Nat Microbiol* **2018**

Andrianaki..., and Chamilos *Nat Commun* **2018**

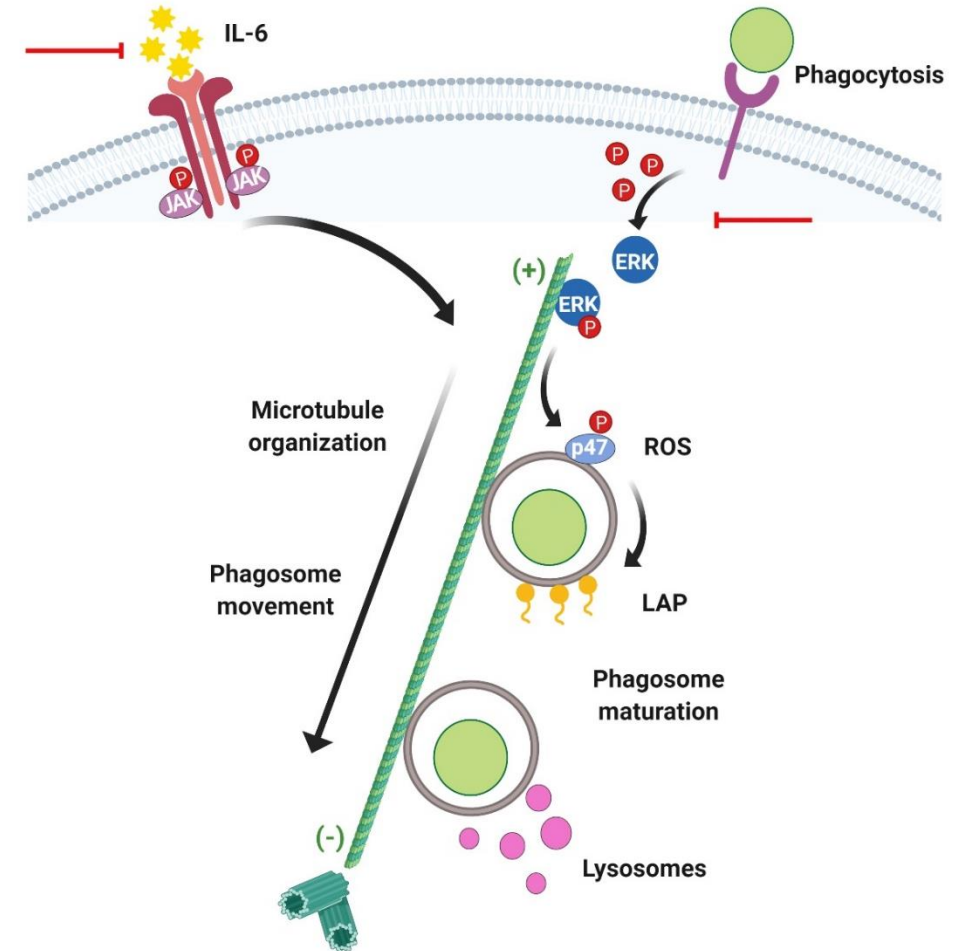
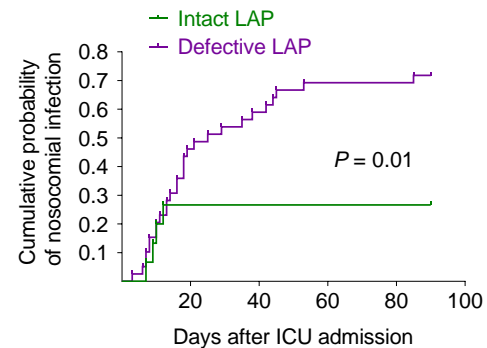
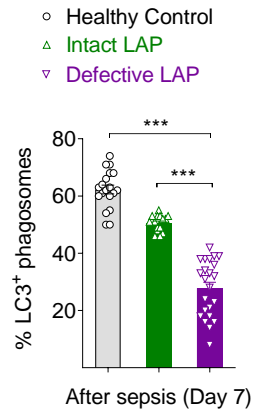
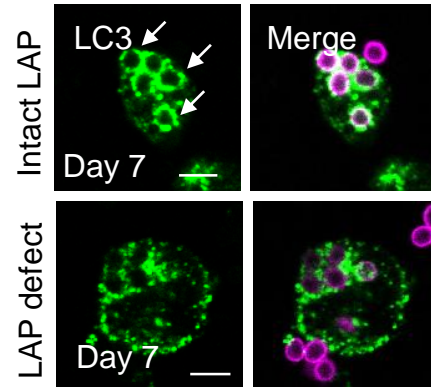
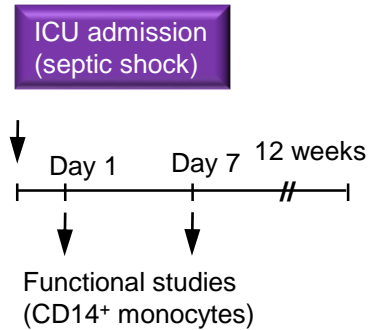
Akoumianaki..., and Chamilos *Cell Host Microbe* **2021**

Evolutionarily conserved role of LAP in antifungal host defense

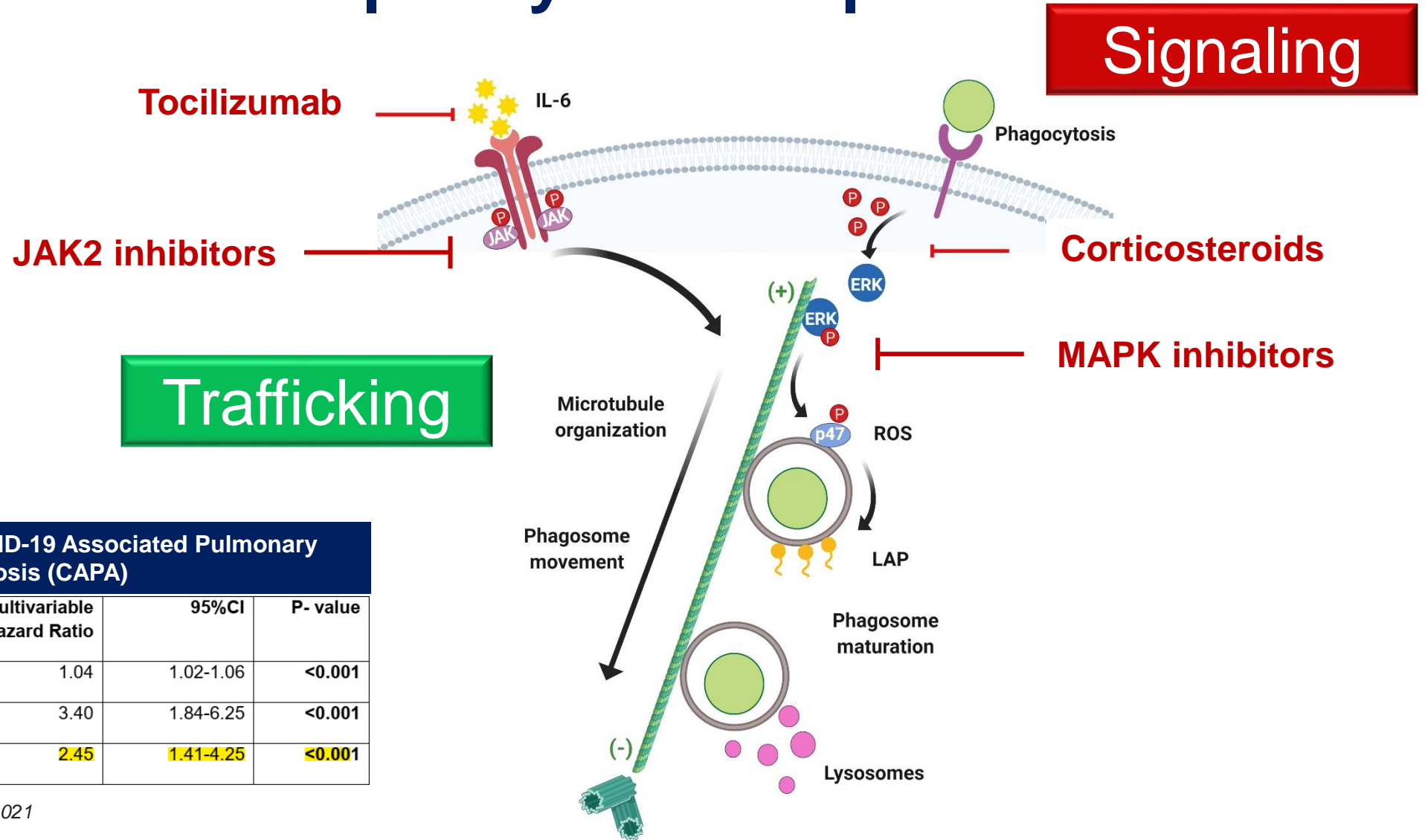


Unpublished work, E. Nenedaki

Uncoupling of cytokine signaling from LAP drives immunoparalysis in sepsis



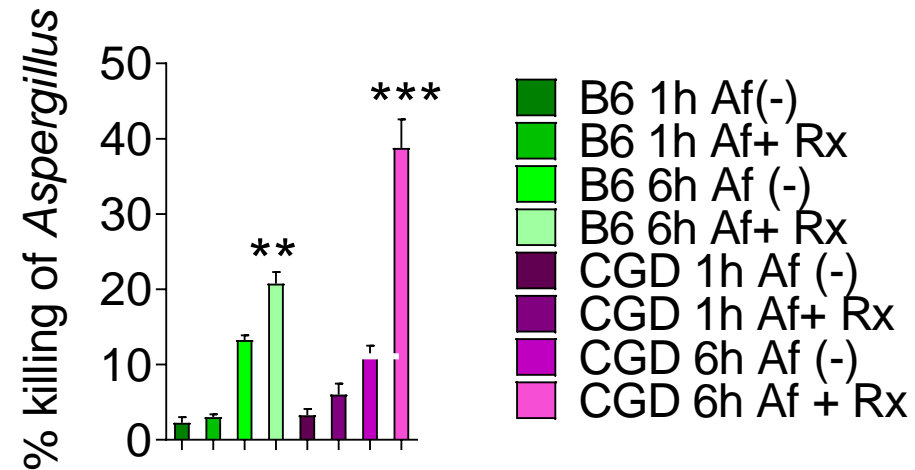
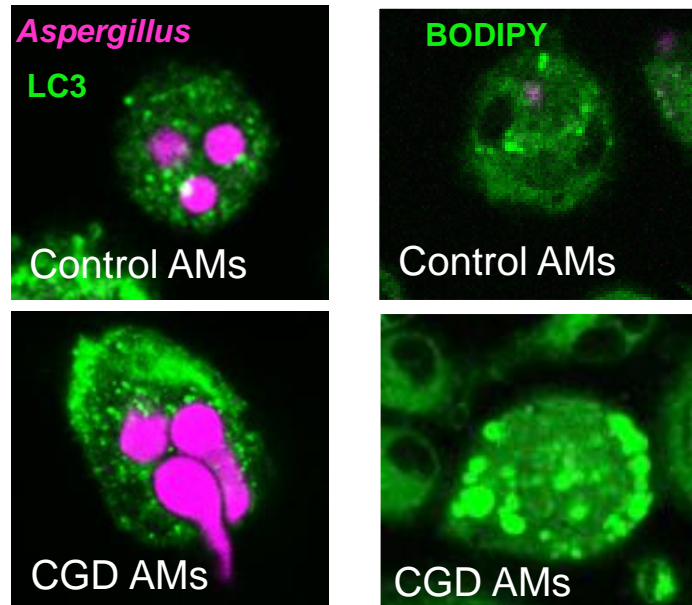
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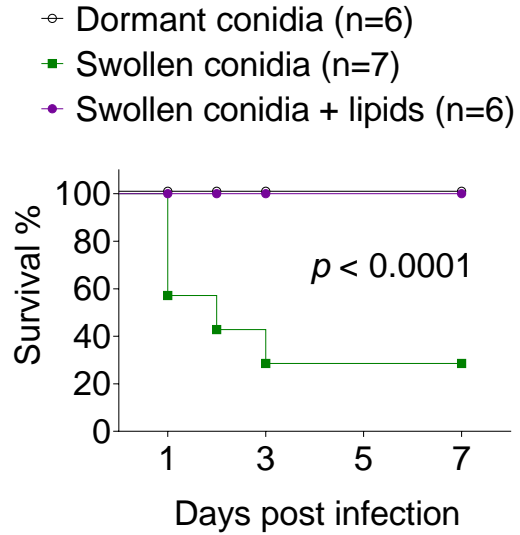
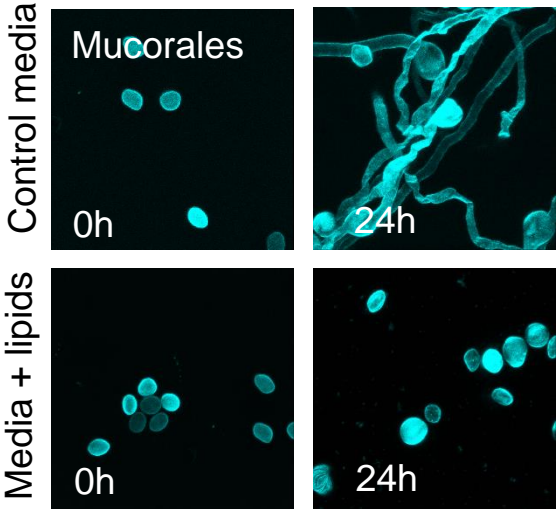
Clinical predictors of COVID-19 Associated Pulmonary Aspergillosis (CAPA)			
Variable	Multivariable Hazard Ratio	95%CI	P- value
Age per year	1.04	1.02-1.06	<0.001
Any invasive respiratory support	3.40	1.84-6.25	<0.001
Tocilizumab	2.45	1.41-4.25	<0.001

Ongoing research

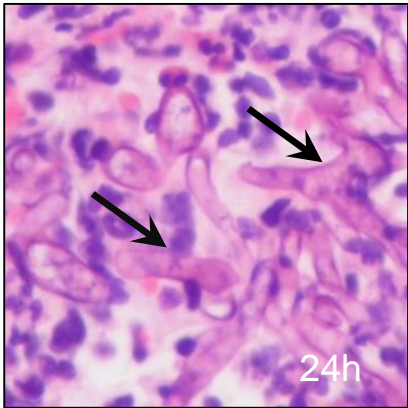
Harnessing lipid metabolism to restore LAP defects



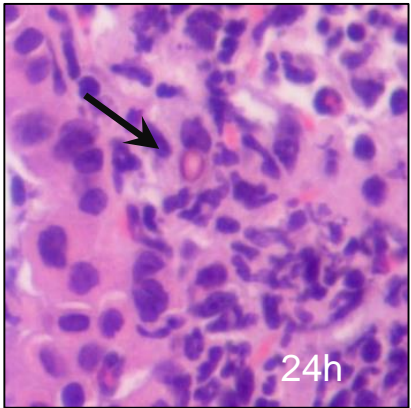
Physiological lipids are specialized antifungal effectors



Swollen conidia



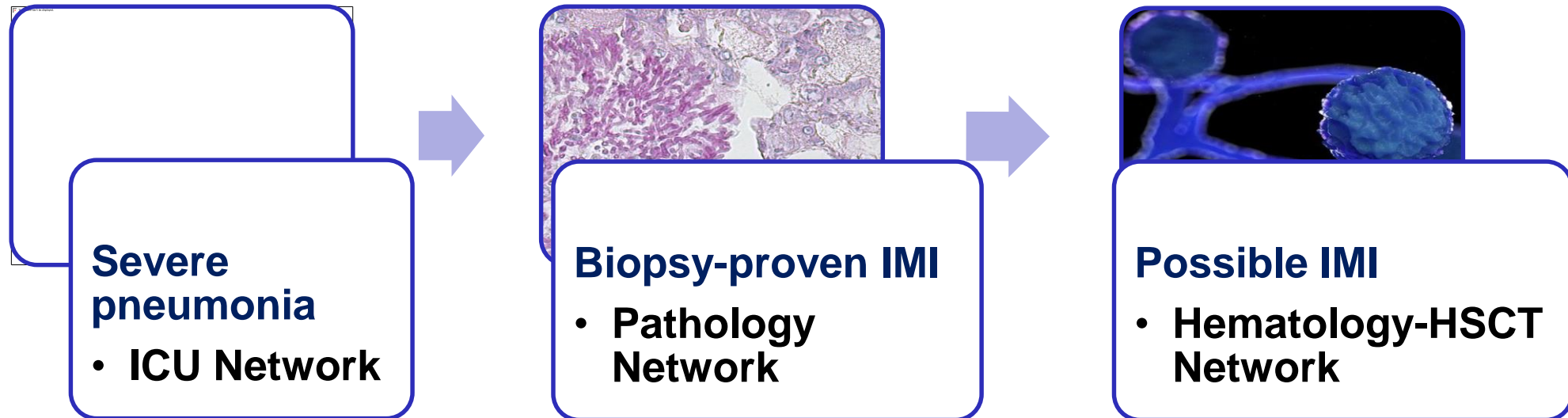
Swollen + lipids



Future collaborative efforts

Organize a **National Fungal Pneumonia Network**

- **5 University Hospitals, 3 Clinical Cohorts**
- **Open access Biobank** (multi-omics, functional assays, organoids)
- Disease mechanisms, biomarkers, prognostic models





European Research Council



Collaborating Labs

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Thank you!