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Epidemiology of azole resistance in the fungus *Aspergillus fumigatus*
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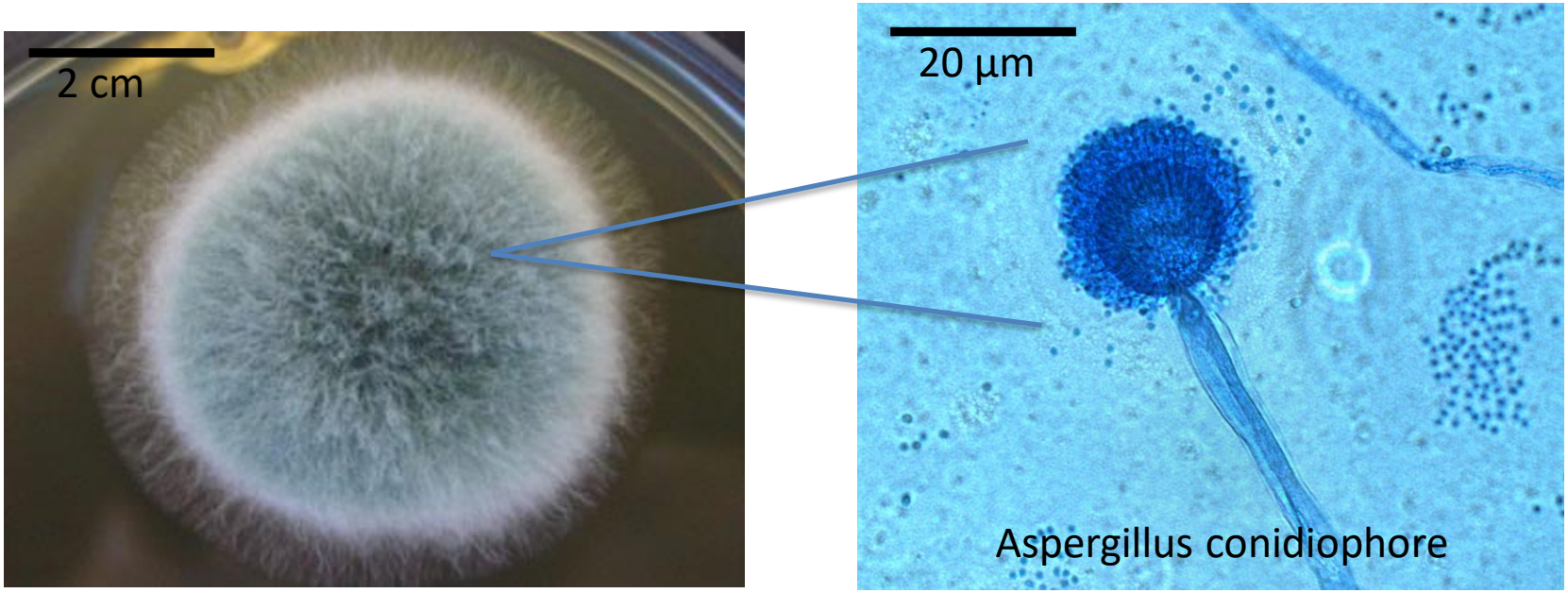
CHUV

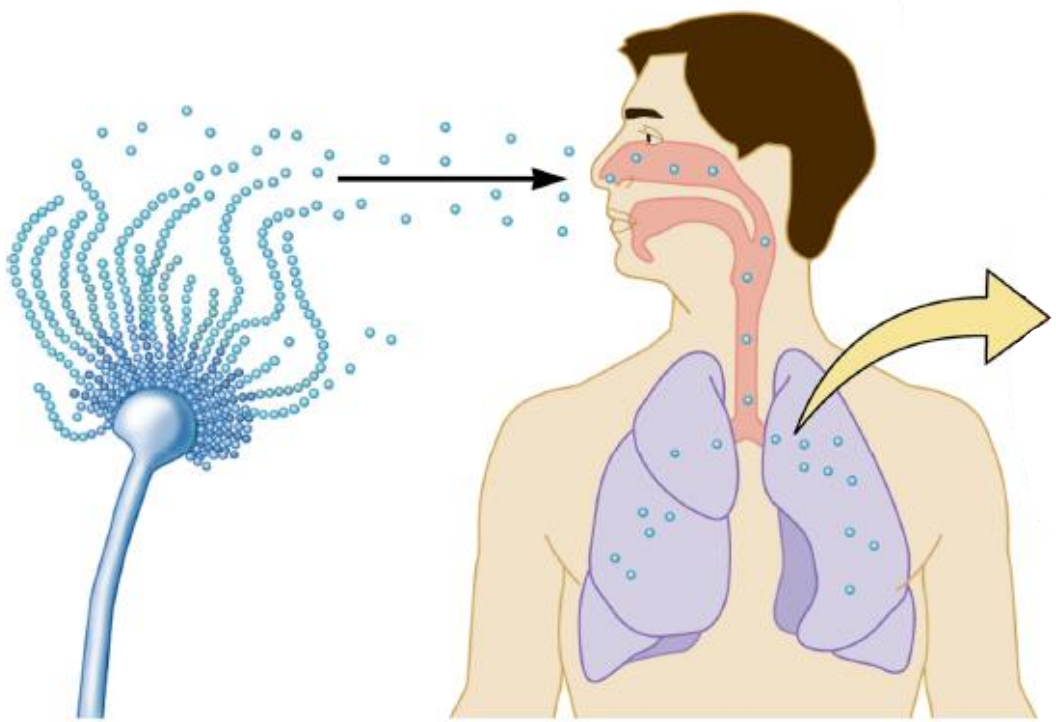
Aspergillus fumigatus: an ubiquitous filamentous fungus



Filamentous fungus producing conidia

- ***A. fumigatus* is present in our environment and participates in the degradation of plant matter/organic matter**
  - Major fungus of the compost microbiome, present in silos
  - Present in various types of soils
  - High ability to produce small spores (2-3 µm) that propagate in the ambient air (10^2-10^6 spores/m^3)

Aspergillus fumigatus: a problematic pathogen in humans



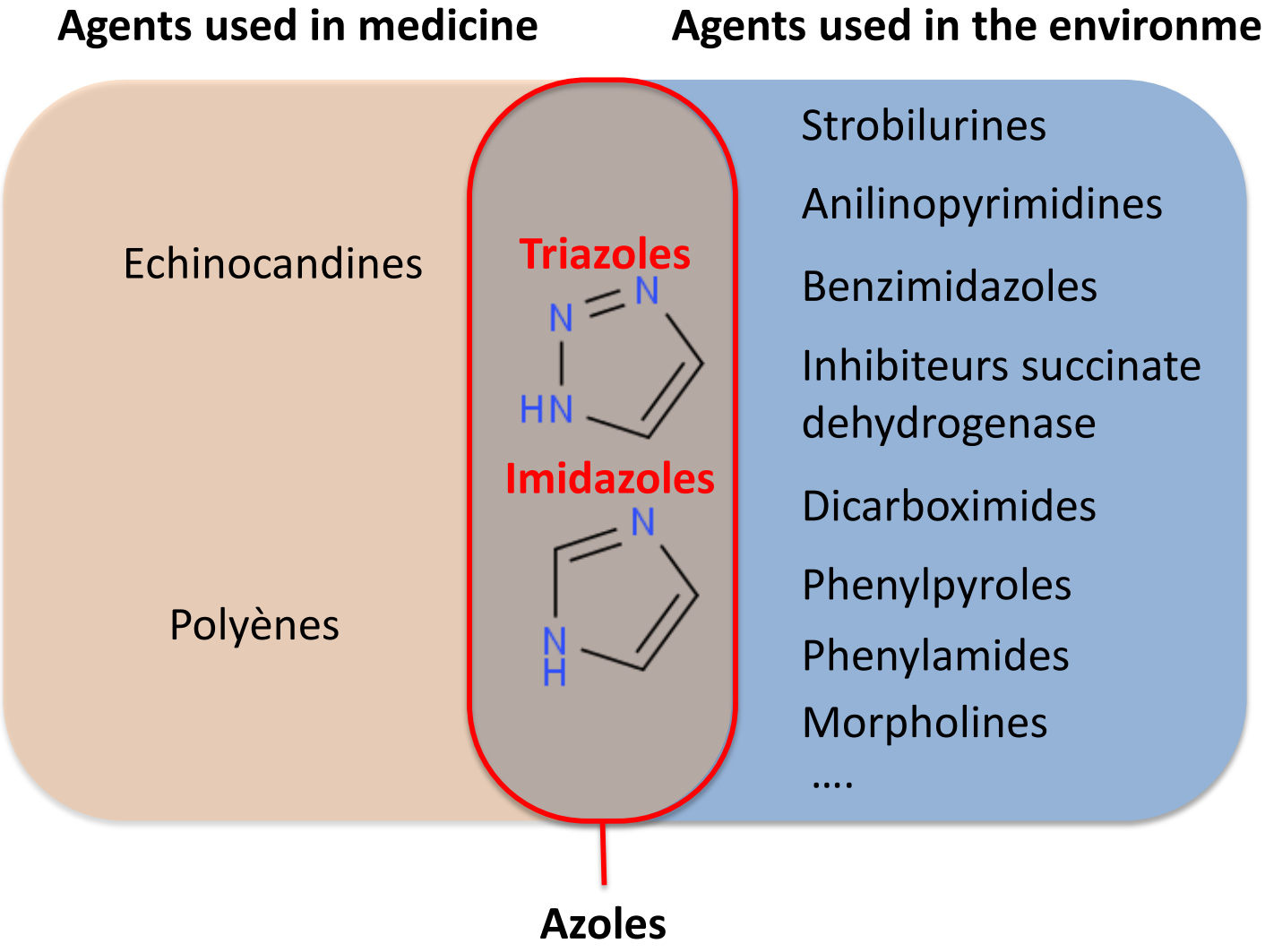
Spores
in ambient air

Colonisation in human through respiratory tract

Healthy individuals
Colonisation is controlled

Immuno-compromised individuals
A. fumigatus mediates diseases
1. Respiratory diseases
2. Invasive diseases (high mortality)

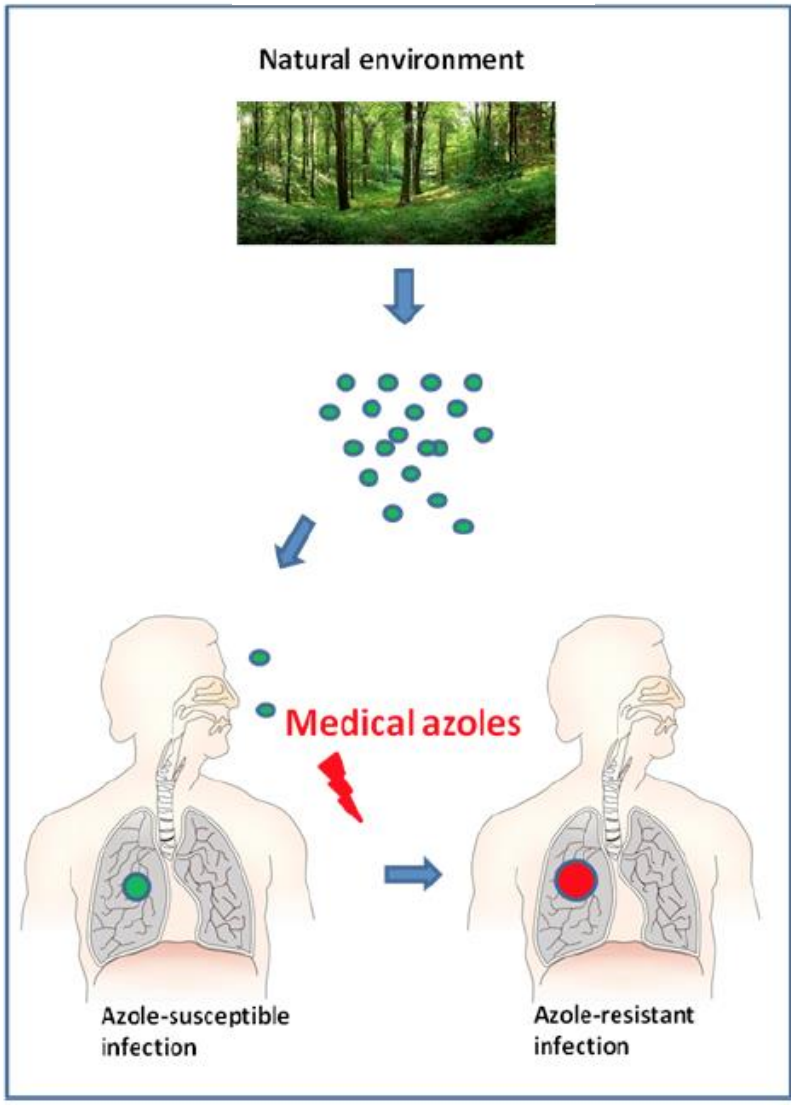
Aspergillus fumigatus: Antifungal treatments



Azoles are used as well in medicine as in agriculture

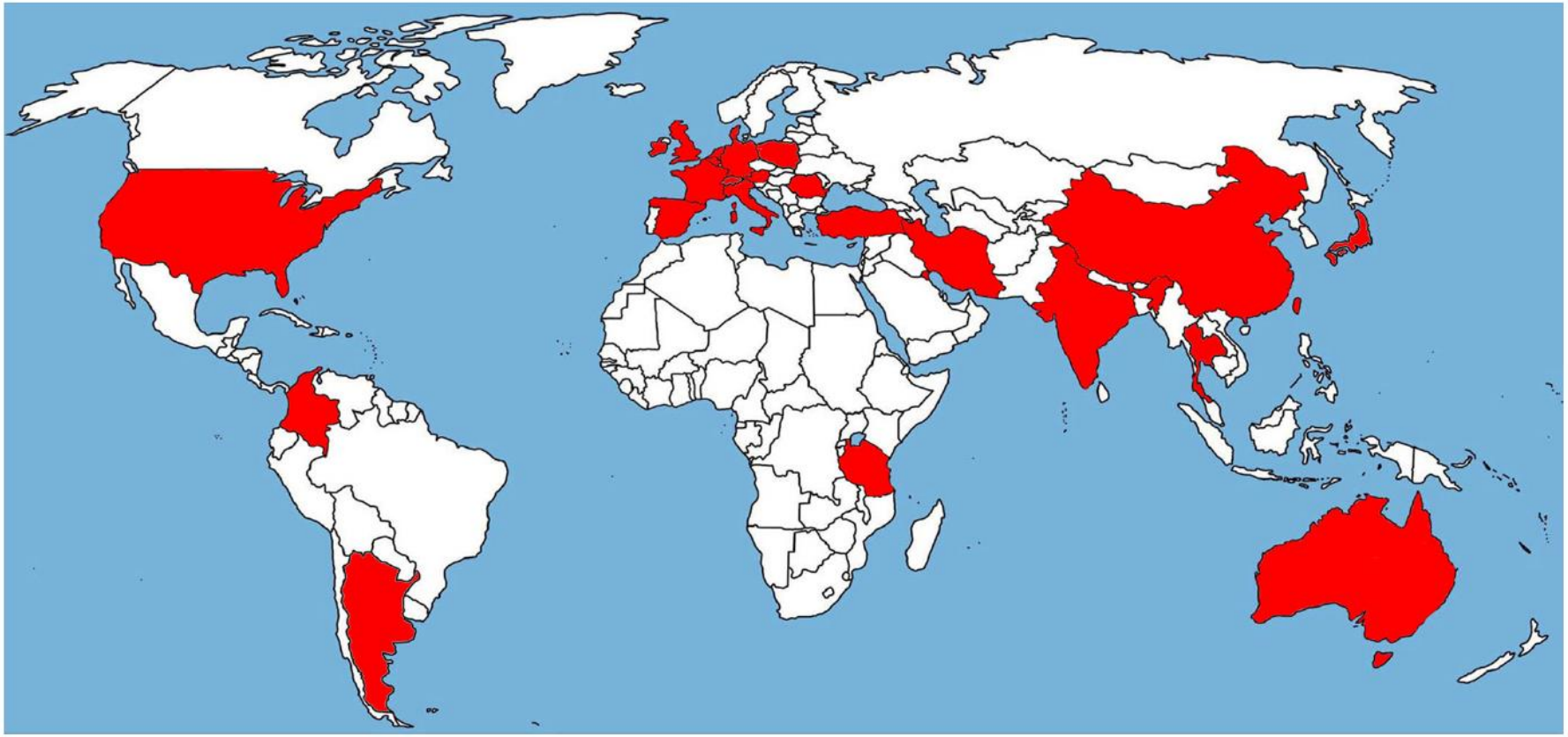
Aspergillus fumigatus: Antifungal resistance

Hospital/clinic



Very few treatment alternatives

Azole resistance in Aspergillus fumigatus and environmental acquisition



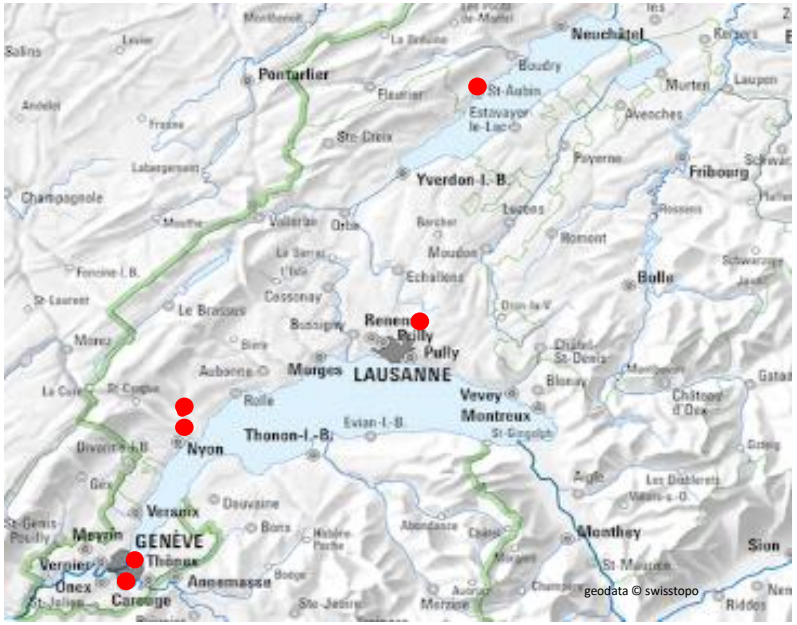
World map of countries reporting azole resistance

Fisher MC, Hawkins NJ, Sanglard D, Gurr SJ. 2018. Worldwide emergence of resistance to antifungal drugs challenges human health and food security. Science 360:739–742.

Azole resistance in Aspergillus fumigatus in Switzerland

- Use of azole fungicides is ≈40 t/year
- Pilot study in western part of Switzerland

K. Gindro (Changins)
J. Schrenzel/A. Riat (HUG)



Riat et al (2018) AAC 62:e02088–17

- 2015: out of 64 soil/compost samples, 7 were positives for *A. fumigatus* azole-resistant isolates **(10 % occurrence)**
- 2016-2018: 3 hospitalized patients (HUG) were infected by resistant isolates (w/o known azole treatment)

Genetic signature of azole resistance suggesting environmental acquisition

Epidemiology of azole resistance in *Aspergillus fumigatus* in the swiss territory

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A. Riat	**HUG**
K. Gindro (S. Schuerch, P.H. Dubuis)	**Agroscope Changins**

- Project financed by the «Commission fédérale d'experts pour la sécurité biologique» (OFEV/BAFU) 2019-2020

- Splitting of Swiss territory in several zones

- Sampling in different soils
  - Soils used by the agriculture (viticulture/arboriculture/field crops, etc)
  - Soils without agricultural activities
  - Private/public area
  - Questionnaire assessing fungicide usage

- Air sampling in specific area

- help from Agroscopes network