

Montpellier SupAgro

Junior Research Lab

Agricultural Transition

**Project: BLOB (*Physarum polycephalum*)**

**Research Question**

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# Abstract

# Introduction

Physarum polycephalum, commonly known as the ‘blob’ is an acellular organism classified as a myxomycete. Due to a number of complex traits, such as spatial memory (Reid et al. 2013) or social interaction (Reid and Latty 2016), Physarum has continuously gained attention in a variety of scientific fields. In order to detect sources of feed, Physarum is capable of movement by expanding and growing branches (Werner 2019). Depending on the availability of nutrition, the frequency of the oscillation in the plasmodium changes (Reid et al. 2012), causing the tubes that are contained in the branches to grow bigger when they are in contact with feed. The branches that were not able to detect feed will be retracted (Werner 2019). Using this strategy the Physarum can explore his environment and has shown to consequently avoid populating areas that he has already discovered before, by evading the extracellular slime track itself or conspecifics left behind (Reid et al. 2013). The presence of other Physarums as well as external stressors can further have an impact on the organism’s motivation to reach a food source (Reid and Latty 2016; Stirrup and Lusseau 2019). Therefore the Physarum is not only capable of complex decision making (Reid et al. 2016) but also shows patterns of social interaction that were thought to be unique to the animal kingdom (Reid and Latty 2016). Besides the ability to recognize conspecifics, different individuals of Physarum can communicate through a cAMP signal cascade (Masui et al. 2018). Furthermore, the Physarum is capable of developing a form of memory, being expressed by spatial memory, allowing it to explore its environment in the most efficient way by always finding the closest connection between feeding sources and even solve complex mazes (Nakagaki et al. 2000; Tero et al. 2010) driven by attractants such as feed or repellents, e.g. toxins (Terayama et al. 1978). In addition to that Physarum can develop a memory for different materials and recognise chemicals. It has even been shown that it is capable of learning through habituation (Boussard et al. 2019) and consequently can get used to and differentiate a variety of chemicals.

**Add to Zotero:**

(Cavender 1995) 🡪 cannot access

(Werner 2019)

(Nakagaki et al. 2000)

(Tero et al. 2010)

(Reid et al. 2013)

(Reid and Latty 2016)

(Reid et al. 2016)

(Stirrup and Lusseau 2019)

(Latty and Beekman 2011)

(Briard et al. 2020)

# Methods

## Strains of Physarum polycephalum

## Data collection and analysis

# Results

# Discussion

# Conclusion

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