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Project: Investigating the role of serine proteases in basidiomycete fruiting body development and nutrient acquisition from humic-rich environments.

Agaricus bisporus, (common button mushroom), has both economic and biotechnological significance. It is the most cultivated mushroom worldwide and the mushroom industry in Ireland represents the largest horticultural sector. The basidiomycete fungi have a clear ecological role, where the depolymerisation of biopolymers is a key process in the cycling of carbon, with litter decomposition in temperate forests mainly driven by fungal activity. They constitute a major fraction of the living biomass responsible for efficient degradation of many recalcitrant organic compounds in soil litter and the humic layer.

The ink cap mushroom *Coprinopsis cinerea* (formally *Coprinus cinereus*), has long been regarded as one of the best model systems for the study of basidiomycete fungi, in particular the economically significant *A. bisporus*. Most attention in *C. cinerea* has been focused on processes such as mating type determination and also on meiosis. Little detail is known about the other aspects of the biology of this fungus such as the cellular mechanisms involved in the development of fruiting structures.

Serine proteinases have been shown to be significant in both post-harvest spoilage of mushrooms and nutrient acquisition from compost. This research seeks to fully elucidate the function of serine proteases in mushroom fruiting body development and nutrient acquisition through promoter profiling. The aims of my research are:

1. Isolation and profiling of candidate fruiting promoters
2. Expression of SPR1 in *C. cinerea* and silencing of the *A. bisporus* SPR1 at different fruiting body development stages
3. Investigation of endogenous serine proteases in *C. cinerea*
4. Determination of factors affecting the regulation of serine proteases