The Effects of Stress on Expression of Pin3 in *Candida albicans*

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In host cell environments *C.albicans* often face numerous stress conditions, which prompt specific stress responses. Stress responses often involve the expression of heat shock proteins. Previous studies on a model organism, *Saccharomyces cerevisiae,* have shown that a protein often involved in stress responses is Pin3. In *S.cerevisiae*, Pin3 regulates protein aggregation and stabilizes prions. This study aimed to determine if Pin3 in *C.albicans* serves a similar role in stress responses. In this study *C.albicans* were placed under various stress and growth conditions, including oxidative stress, thermal stress, and induction of hyphal growth. After *C.albicans* were exposed to a given stressor, Pin3 levels were analyzed with a Western Blot. By comparing *C.albicans* strains with and without Pin3, the results could indicate if exposure to a stressor affected Pin3 levels and if Pin3 was involved in a stress response. The study did not find that Pin3 in *C.albicans* had the same role as in *S.cerevisiae*. Pin3 did not affect responses to oxidative stress and Pin3 levels did not change as a result of heat shock. However, experiments on hyphae induction found that growth in fetal calf serum media increased Pin3 levels. These findings may be related to the various signaling pathways that can be activated when *C.albicans* switch from a budding yeast morphology to a hyphal morphology (Feng et al., 1999) (Sato et al.,2020). This change in morphology is often attributed to *C.albicans'* virulence, thus these findings can be considered to expand on the role of Pin3 during filamentous growth.

Candida albicans are a single celled, commensal, and pathogenic fungus, which can be found within humans. Although usually harmless, a change in its growth pattern can pose serious health risks for immuno-compromised individuals. Their virulence can be attributed to changes in their growth morphologies. *C.albicans* can change between a budding yeast form and a hyphae form. When in its hyphal morphology, the yeast forms elongated, filamentous structures. It is in the hyphal form that the yeast can cause damage to host cells, through the secretion of proteins that penetrate host cells.

In the presence of host cells, C. *albicans* can encounter numerous forms of stress including oxidative and thermal stress*. C.albican*s can respond to stress with heat shock proteins and stress response signaling pathways. The stress responses of a similar organism, *Saccharomyces cerevif1 0 hBT 0 1 35the presWBT G[in)5(c*

concentration and placed onto a quadrant of plates inoculated with either Wild Type (WT) or Pin3 deletion strains.

peroxide, the results did not seem to differ between *C.albicans* strains with and without Pin3 (fig. 1C & 1D). A zone of inhibition was visible at the highest concentration, 1000mM. At the highest concentration of hydrogen peroxide, the diameters for strains without Pin3 ranged from 11.5-12mm(fg. 1C). Similarly, at the highest concentraton of hydrogen peroxide for strains with Pin3, the diameters ranged from 11-13mm (fg. 1D). It can be stated that both types of *C.albicans* strains were sensitve to both oxidatve stressors at high concentratons. However, there was an increased sensitivity to bleach as opposed to hydrogen peroxide. The zones of inhibition in the presence of bleach were almost twice as large than those of hydrogen peroxide (fig 1A & 1B). It does not appear that the presence of Pin3 affects sensitivity to a given oxidative stressor. The results between strains with and without Pin3 were similar across oxidative stressors. Thus these findings do not support that Pin3 in *C.albicans* affects resistance to oxidative stress.

To determine if heat shock affected levels of Pin3 in *C.albicans,* strains with and without Pin3 were placed in a 42ºC water bath. To prevent the yeast from acquiring thermotolerance, the cells were initially resuspended in pre-heated medium before being directly placed into the watthose of hydrogen