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Heterologous expression of a barley homologue Na⁺/K⁺ transporter from *Leptochloa fusca* showed ion permeability and salt tolerance

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The aminoglycoside antibiotic hygromycin (hyg), inhibits yeast growth by hyperpolarization of cell membrane. Wild type and *trk1*, *trk2* yeast (*Saccharomyces cerevisiae*) strains growing on solid Yeast Peptone Dextrose (YPD) media showed growth sensitivity when supplemented with hyg. Growth of potassium uptake deficient yeast strain deprived of its two major K⁺ transporters; *Trk1* and *Trk2*, was used to show the K⁺ uptake activities on expression of *LfHKT2;1*. Loss of growth activity of *trk1*, *trk2* yeast was observed on expression of empty control vector in the presence of hyg while expression of *LfHKT2;1* complemented the growth

activity of *trk1*, *trk2* yeast cells. Increased concentration of Na⁺ resulted in cellular Na⁺ toxicity which elevated on supplementing hyg in the media. Hypersensitivity of *trk1*, *trk2* yeast cells to Na⁺ on expression of *LfHKT2;1*, clearly showed an additional Na⁺ uptake system operating on membrane as confirmed by transient GFP expression studies. Relative abundance of transcripts under low K⁺ concentration revealed the high affinity K⁺ uptake system on expression of *LfHKT2;1*. This study demonstrated the hyg sensitivity of yeast cells as the most powerful screen to functionally characterize membrane transporters and channels.