One of the most severe mycotoxin problems in the U.S. is trichothecene contamination of small grains by Gibberella zeae (anamorph Fusarium graminearum) in a disease called scab or Fusarium head blight (FHB). Here we propose a novel method to control trichothecene contamination in barley using RNA interference (RNAi) technology to block mycotoxin production. Through use of RNAi technology we will:

1. Identify the parameters required for uptake and spread of siRNA in fungi
2. Demonstrate RNAi control of trichothecene production in barley and/or wheat

RNAi is a conserved eukaryotic gene regulatory mechanism often referred to as gene silencing. We propose to silence expression of a key transcription factor gene (tri6) for the control of trichothecene production in Fusarium by transforming barley and wheat with an inverted repeat sequence of tri6 (we propose two crops as one may work better than the other). It is hypothesized that the inverted repeat transcript will be fragmented into small RNA species known as siRNAs as a part of a conserved eukaryotic silencing mechanism. These siRNAs will then be taken up by hyphae and trigger a silencing mechanism in Fusarium. This research is designed to quickly control mycotoxin contamination of barley and wheat.