IACUC research application non-technical summary example (questions #7 and #8 on application)

Initial (bad) version:

Serotonin 5-HT2A receptor agonists produce complex behavioral changes in humans including detachment from reality and distortions in sensory processing. Many of these effects are believed to be mediated by their action in the medial prefrontal cortex. We propose to develop a model to ablate 5-HT2A receptor containing neurons in the mPFC in order to study the behavioral consequences of both loss of this receptor and the effects of drugs like LSD in animals that have lost receptor function in the mPFC. In order to do this, we will use a transgenic rat expressing beta-galactosidase under the control of the LacZ promoter to convert the drug Daun02 into a toxin in brain cells activated by the drug DOI. This should ablate all responding neurons, which we will validate by challenging ablated rats with DOI two weeks later and examining their brains for a lack of neuronal response/activation in the mPFC by immunofluorescence microscopy.

Revised (good) version:

Drugs like lysergic acid diethylamide and the active chemical in psychoactive mushrooms, psilocybin, are known to produce hallucinations and other behavioral effects including distortion of the sense of time and are collectively known as psychedelics. They all activate a protein in the brain called the serotonin 2A receptor. The study of drugs like psychedelics that distort normal reality perception can inform us on the basic processes in the brain that regulate our perception of time and reality under normal waking conditions. In my laboratory we will be exploring the roles of the specific neuron circuits that contain serotonin 2A protein in controlling normal brain processes. Our overall strategy is to selectively and permanently inactivate these neurons in specific brain regions of rats, and then to test the rats in behavioral tests to see how their responses have changed. The first step is to demonstrate that we can indeed selectively inactivate neurons containing serotonin 2A protein so that when animals are re-exposed to a psychedelic drug these neurons are no longer present and that there is no response to drug administration in the particular region of the brain that we will be examining. This protocol details the experiment that we will perform to eliminate the serotonin 2A containing neurons, and the validation that the neurons remaining do not respond to psychedelics at the cellular level.