ND*nano* Undergraduate Research Fellowship (NURF)
2015 Project Summary

1. Student name: Jay Dawahare

2. Faculty mentor name: Joel Boerckel

3. Project title: YAP and TAZ Effects on Bone Formation

4. Briefly describe any new skills you acquired during your summer research:
- Animal handling
- CT, X-Ray, and imaging software
- Surgical knowledge
- Cell culture

5. Briefly share a practical application/end use of your research:
Our ability to understand the function of YAP and TAZ in osteogenesis could lead to improved treatment of people with osteoporosis or bone defects.

Begin two-paragraph project summary here to describe problem and project goal and your activities / results:

1 in 3 women and 1 in 5 men over age 50 will experience osteoporotic fractures.[1] This can be prevented through, mechanical loading of these bones. To better understand this process we studied two proteins, YAP and TAZ, that have been found to be sensitive to mechanical loading.[2] It has not yet been proven what role YAP and TAZ play in osteogenesis, so my goal was to study the effects of YAP and TAZ on bone development in mice.

The Boerckel Lab has been breading conditional knockout mice to lack YAP and TAZ from osteoblast-lineage cells using Osx-Cre. This essentially eliminates YAP and TAZ from only bone cells. This breeding strategy results in eight outcomes seen in Figure 1. The mice that are lacking both YAP and TAZ die by day two, with most dying soon after birth. Dosage dependent defects in animal weight and bone development at p10 were observed when various combinations of YAP and TAZ alleles were deleted. Homozygous knock out of either YAP or TAZ with heterozygous knockout of the other did not result in death, though these mice exhibited dose-dependent defects in total weight, skull size, and tibia length. The weight and the length of the Tibia of the YAP homozygous, TAZ heterozygous knockout are significantly smaller than that of the wild type mouse (figures 2, 3). These differences are not seen at 8 weeks. At 8 weeks the bone lengths are not significantly different between any of the genotypes of mice.

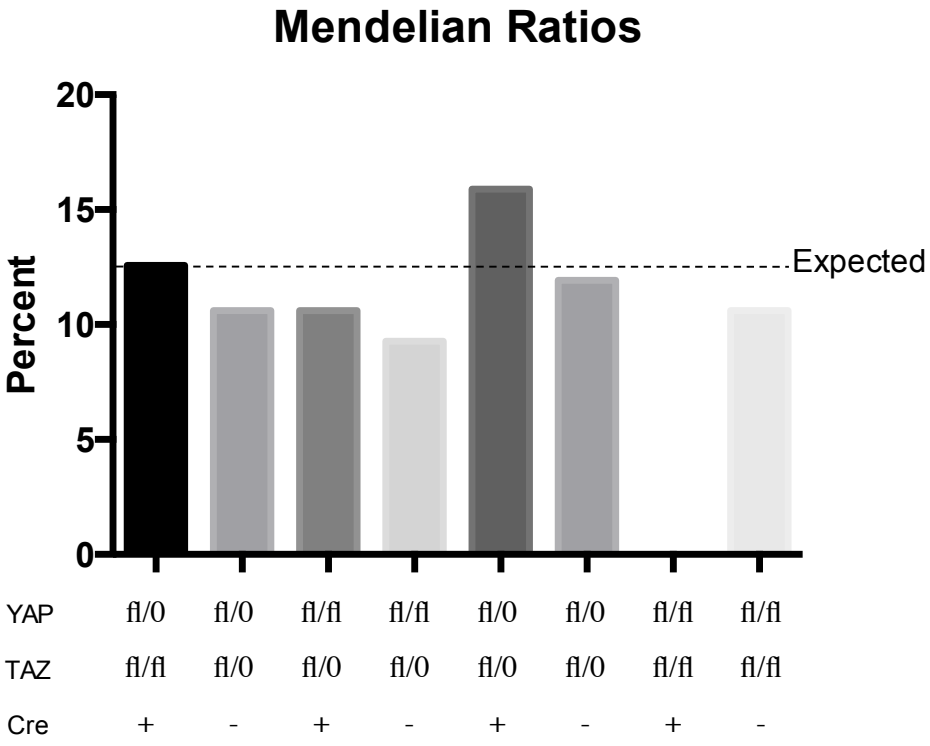

Figure 1: Mendelian ratios of mice. (n=151)

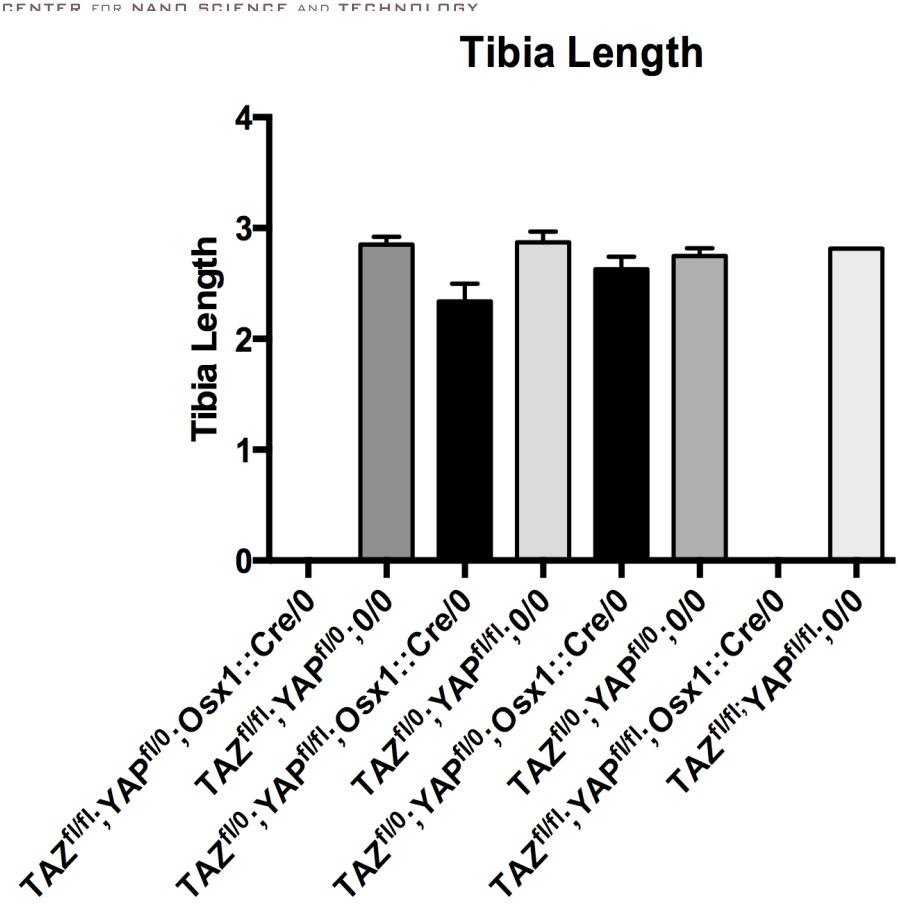

Figure 2: Tibia lengths at p10

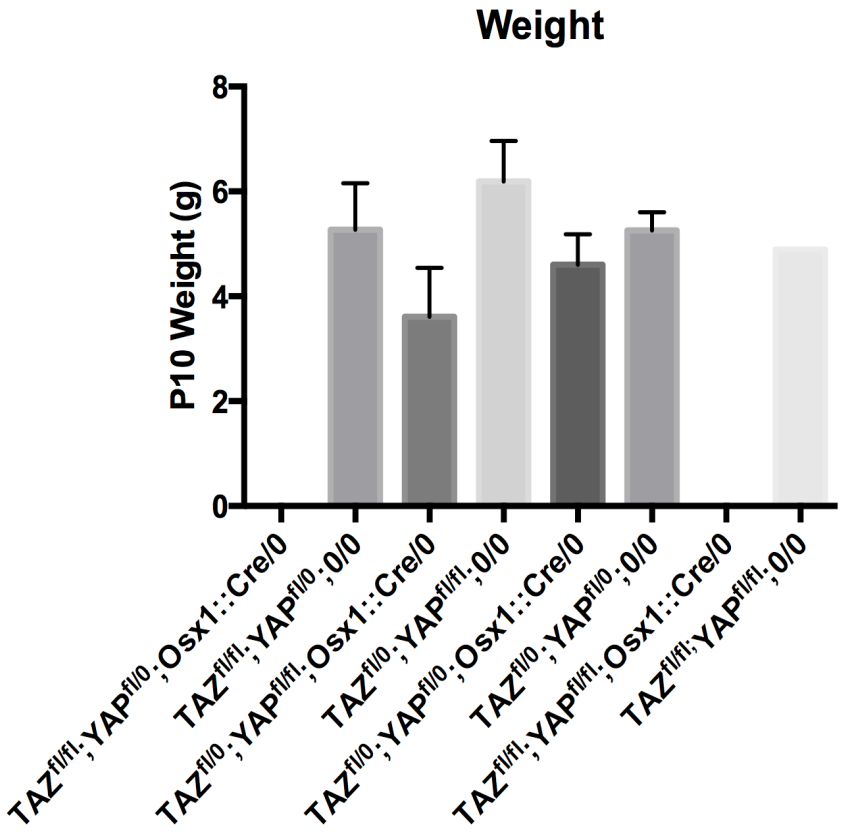

Figure 3: Weights at p10