Among all the diverse classes of peripheral sensory neurons, nociceptors are the ones that mediate pain signalling. They project their fibers in most tissues of the body and fire in response to potential or actual damage, consequently transmitting the information to the central nervous system (CNS). Discrete types of nociceptors can detect different types of noxious stimuli, depending on the membrane receptors and ion channels they express. This heterogeneity arises during their developmental maturation in the dorsal root ganglia (DRG). Nociception protects us from injury but is also associated with the pathological condition of chronic pain, when nociceptors are abnormally sensitized through inflammation or neural damage. Current analgesics are ineffective and drug development requires appropriate models of nociception. MED17.11 is a DRG cell line, derived from the Immortomouse. After 7 days of differentiation, cells demonstrate nociceptive morphology and expression profile, and respond to nociceptor agonists and inflammatory mediators. By tackling many problems of primary DRG cultures and providing a constant supply of cells, MED17.11 appears as a good model for the elucidation of pain pathways and high-throughput screens for new drugs. Its differentiated phenotype, however, is not identical to that of human nociceptors. This project sought to improve the differentiation of MED17.11 through modification of its differentiation medium and further characterize it by use of Western Blotting. Additional passages and pharmacological inhibition of nitric oxide synthase were found effective in priming cells for differentiation. In addition a reduction in serum and nerve growth factor showed potential for leading to an improved final phenotype, as determined by the previously unattained increased expression of NaV1.7, a nociceptor-specific sodium channel. The project and its findings were presented in the SURE Showcase and the British Conference of Undergraduate Research 2016.