Limiting Pain-Related Nerve Sprouting Using Anti-Growth Factor Receptor Antibodies

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Pain is a huge component of both bone cancer and osteoarthritis (OA). With limits to pain treatments in both these diseases, there is a significant need for a medication to treat pain in these patients that raises their quality of life. This study focuses on a specific growth factor called Artemin that has shown up-regulations in these two diseases [Thorten et al., 2013]. Prior research has found that this growth factor may mediate pain hypersensitivity and thermal hyperalgesia when binding to its receptor [Falk et al., 2015]. The presence of Artemin has also shown correlations with an increase of sensory nerve fiber growth; This fuels the supported belief that the overgrowth of nerves, caused by Artemin binding to the artemin-receptor, creates the hypersensitivity that coincides with these two diseases. This study uses a specifically designed antibody to bind to the artemin-receptor in order to block the binding of this growth factor, thus limiting the signal for nerve fiber overgrowth. Through histology and analysis of mouse model tissues, trends were found supporting the hypothesis towards decreased fiber count and significance was found with increased fiber diameter ($p=0.0229$), showing fiber recoiling, which is a sign of fiber death. As well, these histology results were compared with previously performed behavioral tests. Although predicted trends were not seen when behavioral tests were compared to fiber count results, there were trends towards increased sensory fiber diameter and decreased pain states, supporting the hypothesis. An increase of trials must be re-performed for both diseases with an increase of treatment time and a larger sample size in order to see this drug possibility on a larger scale.