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Advancing the Arizona State University Knowledge Enterprise

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QSOX1 as an anti-neoplastic drug target

Despite tremendous scientific progress and treatment advances, cancer continues to be the leading cause of death worldwide, with approximately 14 million new cases and 8.2 million deaths in 2012 alone (WHO). Because invasion and metastasis are arguably the most dangerous characteristics of cancer, therapeutics that suppress these characteristics could be very valuable.

Quiescin sulfhydryl oxidase1 (QSOX1) is a highly conserved enzyme that is overexpressed in diverse tumors types but not in normal cells or tissue. Research has shown that QSOX1 over-expression plays an important role in cell invasion and migration. Knockdown of QSOX1 expression may lead to reduced tumor cell invasive/migratory phenotypes present in metastatic tumor cells.

Researchers at Arizona State University have discovered that QSOX1 is an incredibly effective anti-neoplastic drug target and have developed some compounds to inhibit QSOX1. Inhibitors of QSOX1 expression/activity, such as short hairpin RNA, antibodies, and aptamers have great potential for anti-cancer therapy. They've shown that QSOX1 inhibition decreased tumor cell growth and diminished invasion through a basement membrane. In vitro studies showed that treating BxPC3 pancreatic cancer cells with inhibitors resulted in a 70% decrease in cellular invasion. Further, these compounds could sensitize tumor cells such that other therapeutic agents are more effective or could be used in lower doses.

These inhibitors show great promise in slowing tumor growth and preventing the metastatic process in tumors that over-express QSOX1.

Potential Applications

- Treatment or prognosis of tumors that over-express QSOX1 (non-limiting tumor types: pancreatic, lung, colon, breast and prostate tumors)
  - Reduce/slow the increase in tumor mass
  - Diminish tumor cell viability
  - Suppress metastasis
  - Limit/prevent/inhibit worsening/reduce recurrence of symptom development
  - Increase survival time
- Sensitizing a tumor to other anti-neoplastic agents
  - Enhance current therapies
  - Enable decrease dose of current therapies

For more information about the inventor(s) and their research, please see Dr. Lake's departmental webpage