Mutations of the CHEK2 gene in patients with cancer and their presence in the Latin American population [version 1; referees: awaiting peer review]

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Abstract

Background: CHEK2 (Checkpoint Kinase 2) encodes CHK2, a serine/threonine kinase involved in maintaining the G1/S and G2/M checkpoints and repair of double-strand DNA breaks via homologous recombination. Functions of CHK2 include the prevention of damaged cells from going through the cell cycle or proliferating and the maintenance of chromosomal stability. CHEK2 mutations have been reported in a variety of cancers including glioblastoma, ovarian, prostate, colorectal, gastric, thyroid, and lung cancer in studies performed mainly in White populations. The most studied mutation in CHEK2 is c.1100delC, which was associated with increased risk of breast cancer. The objective of this study was to compile mutations in CHEK2 identified in cancer genomics studies in different populations and especially in Latin American individuals.

Methods: A revision of cancer genomics data repositories and a profound literature review of Latin American studies was performed.

Results: Mutations with predicted high impact in CHEK2 were reported in studies from Australia, Japan, United States, among other countries. The TCGA cancer types with most mutations in CHEK2 were breast, colorectal, and non-small cell lung cancer. The most common mutation found was E321* in three patients with uterine cancer. In Latin American individuals nine mutations were found in melanoma, lymphoma, and head and neck cohorts from TCGA and ICGC. Latin American studies have been restricted to breast and colorectal cancer and only two mutations out of four that have been interrogated in this population were identified, namely c.1100delC and c.349A>G.

Conclusions: This study presents a compilation of mutations in CHEK2 with high impact in different cancer types in White, Hispanic and other populations. We also show the necessity of screening CHEK2 mutations in Latin American in cancer types different than breast and colorectal.