Advances in detecting and treating rare genetic variants of colorectal cancer

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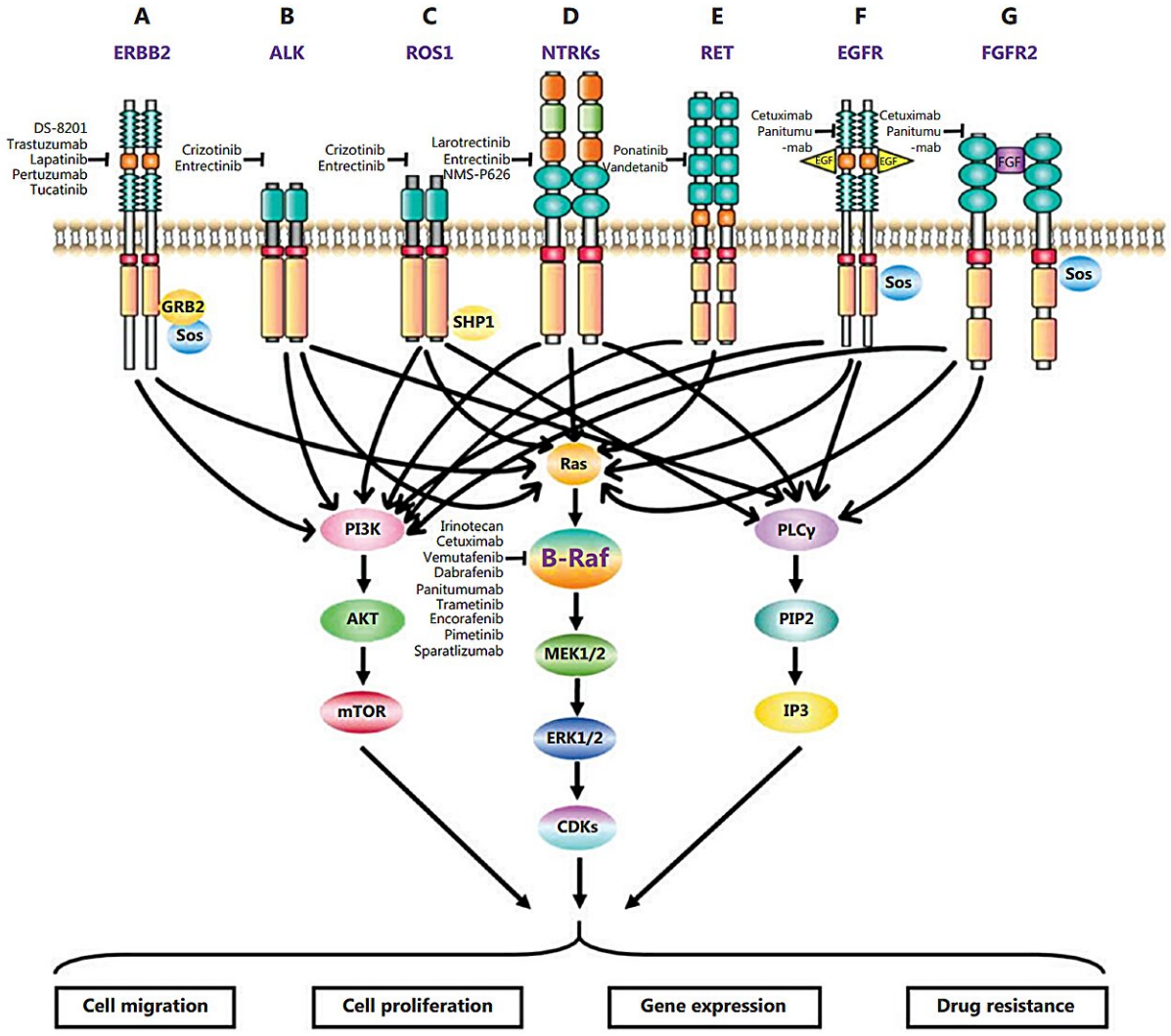

Expression products and effects of rare mutated genes in CRC. (A) ERBB2 (HER2), (B) ALK, (C) ROS1, (D) NTRK1, NTRK2, and NTRK3, (E) RET, (F) EGFR, and (G) FGFR2 activate Ras-Raf-MAPK, PI3K-AKT, and PIP2-IP3

signaling pathways and ultimately facilitate cell migration, cell proliferation, gene expression, and drug resistance. Credit: Cancer Biology & Medicine

Recent research highlights the importance of targeted therapies for treating advanced colorectal cancer (CRC) with rare genetic variants. These mutations, often linked to poor prognosis and limited response to conventional treatments, are being addressed through advanced sequencing technologies and new targeted drugs. This study explores the clinical diagnosis and treatment strategies tailored to these unique genetic profiles.

Colorectal cancer (CRC) presents a significant health challenge, especially with rare genetic variations complicating treatment. Traditional therapies often fall short for these unique profiles, emphasizing the need for personalized approaches.

Advances in sequencing technologies have uncovered numerous rare genetic mutations tied to poor prognosis and limited response to conventional treatments. These challenges highlight the urgency of in-depth research to improve diagnostic accuracy and develop targeted therapies. Due to these issues, further investigation into tailored treatment strategies for CRC is essential.

Researchers from the State Key Laboratory of Holistic Integrative Management of Gastrointestinal Cancers, Fourth Military Medical University, published their summary on the diagnosis and treatment of CRC with rare genetic variants in *Cancer Biology & Medicine* in June 2024. This study underscores the potential of advanced sequencing techniques and targeted therapies in improving patient outcomes.

The study reviews the clinical diagnosis and treatment of CRC with rare

genetic variations, including mutations, amplifications, and rearrangements in genes such as ERBB2, BRAF, ALK, ROS1, NTRKs, RET, FGFR2, and EGFR. These genetic alterations often lead to poor responses to conventional therapies, necessitating precise, individualized treatment strategies.

For instance, HER2 amplification or mutation in a subset of CRC patients has shown promise with dual-targeted therapies like trastuzumab and lapatinib. The study highlights the benefits of combining targeted therapies with existing treatments, noting significant improvements in progression-free survival and overall survival rates.

Additionally, the research emphasizes the potential of advanced sequencing technologies in identifying these rare genetic variations, enabling the development of more effective and personalized treatment regimens for CRC patients.

Dr. Yuanyuan Lu, a senior researcher in the study, stated, "Our findings underscore the critical need for personalized treatment regimens for CRC patients with rare genetic variants. The integration of advanced sequencing technologies and targeted therapies holds great promise for improving patient outcomes and paving the way for more effective cancer treatments."

The study's findings have significant implications for the future of CRC treatment. By identifying specific genetic targets and developing corresponding therapies, health care providers can offer more precise and effective treatments, potentially improving survival rates and quality of life for CRC patients. The continued exploration and application of these targeted therapies are expected to revolutionize the management of CRC, particularly for those with rare genetic mutations.

More information: Shuyi Chen et al, Progress in clinical diagnosis and

treatment of colorectal cancer with rare genetic variants, *Cancer Biology & Medicine* (2024). DOI: 10.20892/j.issn.2095-3941.2024.0026