A paucity of therapeutic options is available to treat men with metastatic castration-resistant prostate cancer (mCRPC). However, recent developments in our understanding of the disease have resulted in several new therapies that show promise in improving overall survival rates in this patient population.

METHODS: Agents approved for use in the United States and those undergoing clinical trials for the treatment of mCRPC are reviewed. Recent contributions to the understanding of prostate biology and bone metastasis are discussed as well as how the underlying mechanisms may represent opportunities for therapeutic intervention. New challenges to delivering effective mCRPC treatment will also be examined.

RESULTS: New and emerging treatments that target androgen synthesis and utilization or the microenvironment may improve overall survival rates for men diagnosed with mCRPC. Determining how factors derived from the primary tumor can promote the development of premetastatic niches and how prostate cancer cells parasitize niches in the bone microenvironment, thus remaining dormant and protected from systemic therapy, could yield new therapies to treat mCRPC. Challenges such as intratumoral heterogeneity and patient selection can potentially be circumvented via computational biology approaches.

CONCLUSIONS: The emergence of novel treatments for mCRPC, combined with improved patient stratification and optimized therapy sequencing, suggests that significant gains may be made in terms of overall survival rates for men diagnosed with this form of cancer.