Abstract Genome editing (GE) tools have been revolutionizing life sciences by various marvelous applications for targeted gene modifications in organisms.In particular, meganucleases (MegNs), zinc finger nucleases (ZFNs), transcription activator–like effector nuclease (TALENs), and clustered regularly interspaced short palindromic repeats (CRISPR)/CRISPR–associated protein 9 (Cas9) (CRISPR/Cas–9).Robb et al. (2019) defined and compared the three terms: "genome engineering", "genome editing", and "gene editing". Genome engineering is the field in which the sequence of genomic DNA is designed and modified. Genome editing and gene editing are techniques for genome engineering that incorporate site–specific modifications into genomic DNA using DNA repair mechanisms. Gene editing differs from genome editing by dealing with only one gene (Khalil, 2020). The human genome developments paved the way for more extensive use of the reverse genetic analysis technique. Nowadays, two methods of gene editing exist: one is called "targeted gene replacement" to produce a local change in an existing gene sequence, usually without causing mutations.GenEd tools, for example, zinc finger nucleases (ZFN), transcription activator–like effector nucleases (TALEN), and CRISPR (clustered regularly interspaced short palindromic repeats)/Cas (CRISPR–associated) systems have been widely used in the last decade for genetic manipulation of plants, animals, microbes, and other organisms.The utility of the CRISPR/Cas tool is widespread compared to other contemporary tools due to its simplicity, efficiency, cost–effectiveness, and accuracy.The future CRISPR system application in life sciences particularly human therapeutics and animal genome editing may be increased by mitigating the off– targets and other limitations of the system.Introduction In classical genetics, the gene–modifying activities were carried out selecting genetic sites related to the breeder's goal.