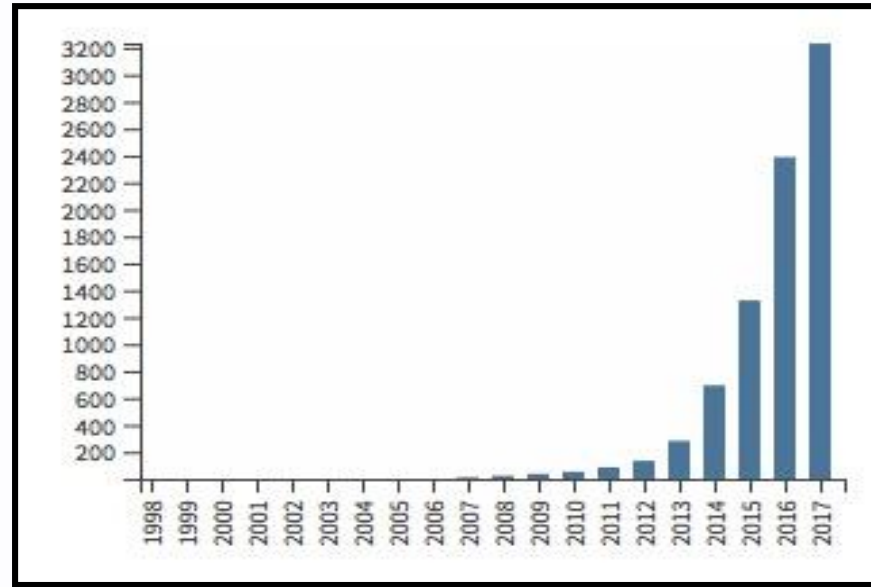
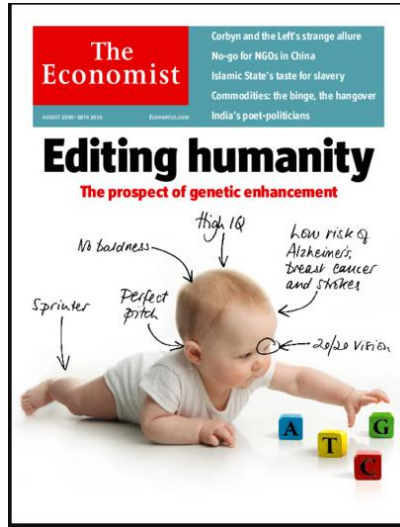
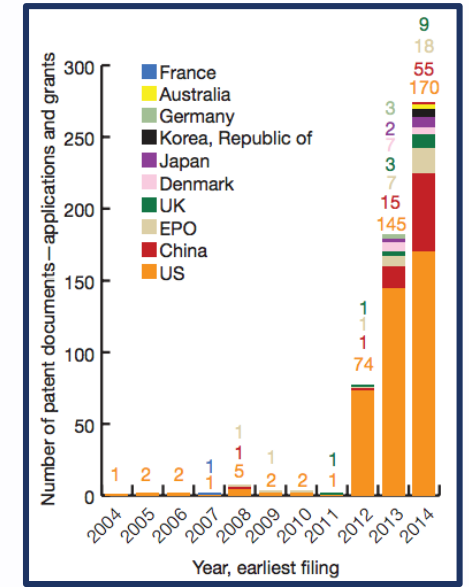


CRISPR gene editing is transforming science



Number of publications per year on CRISPR

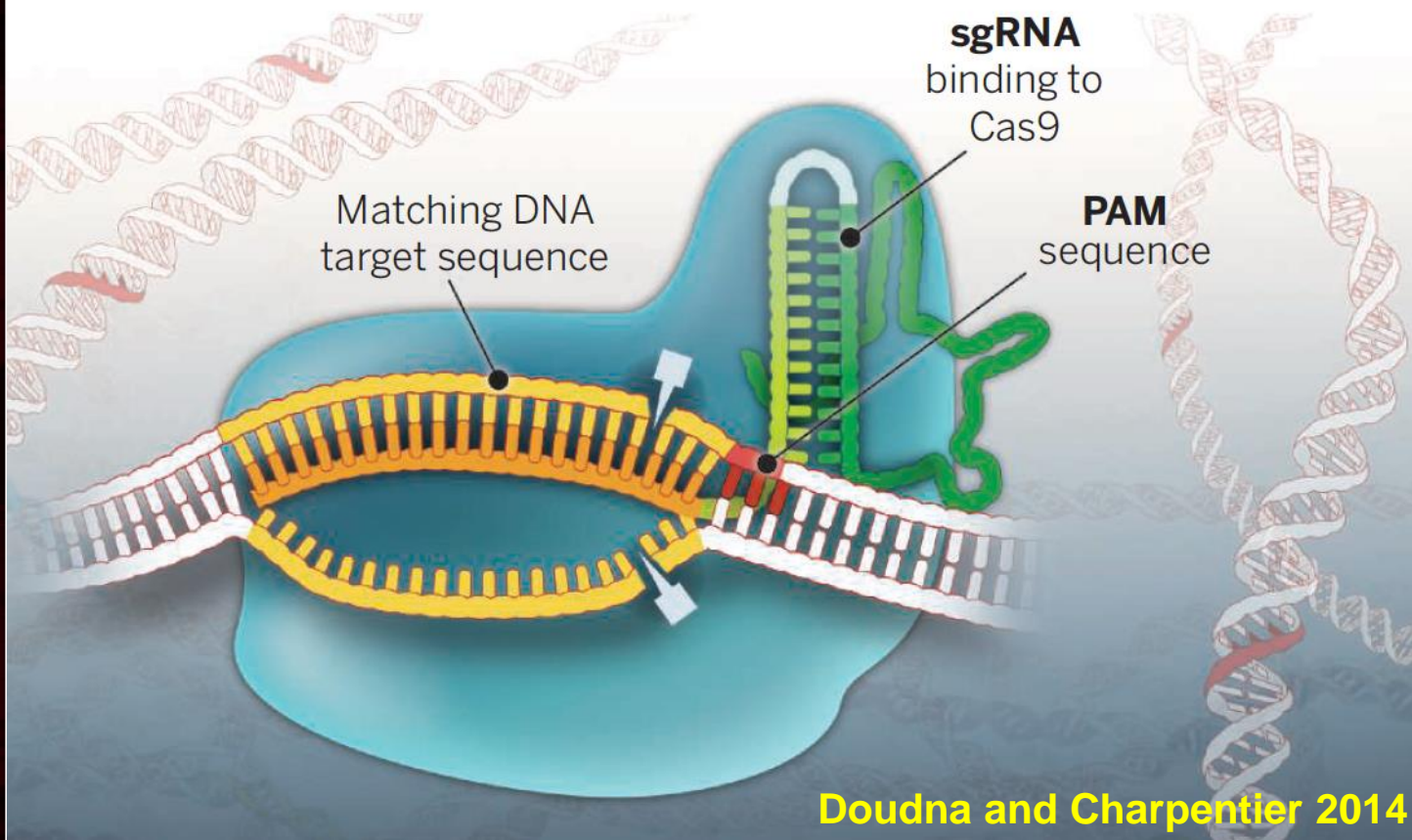


Number of CRISPR patents per year

CRISPR is impacting a wide range of fields:

- Basic biological research
- Medical research and human therapeutics
- Plant and animal research for agriculture

CRISPR is a breakthrough gene editing technology



Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)

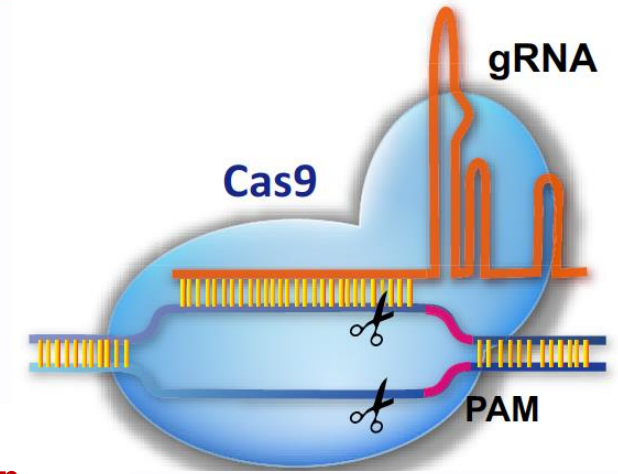
CRISPR-associated protein 9 (Cas9)

In 2012, the CRISPR/Cas9 bacterial immune system was adapted to create a precise and efficient gene editing system

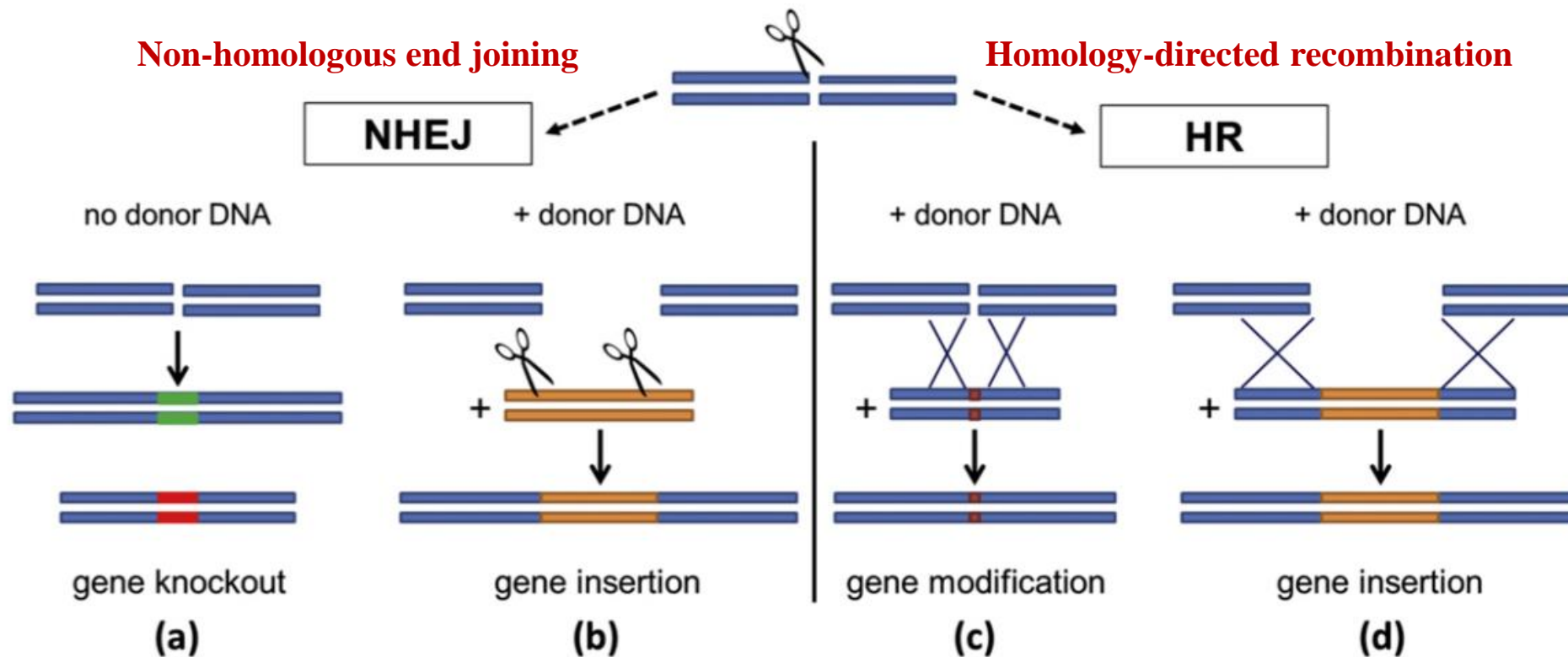
CRISPR/Cas9 advances:

- Forms molecular scissors to cut DNA at a specific location
- RNA-guided system is easier to modify than previous gene editing techniques
- Enables rapid and precise modification of target genes in any organism

CRISPR can enable precise modifications in target genes



Double strand break (DSB)



After CRISPR/Cas9 makes a double strand break, natural repair mechanisms (NHEJ and HDR) provide mechanisms for gene knock-outs, insertions, and modifications