



CRISPR/Cas9

-

-

CRISPR/Cas9

60 1960 Peter Nowell David Hungerford
(Chronic myeloid leukemia: CML)

1973

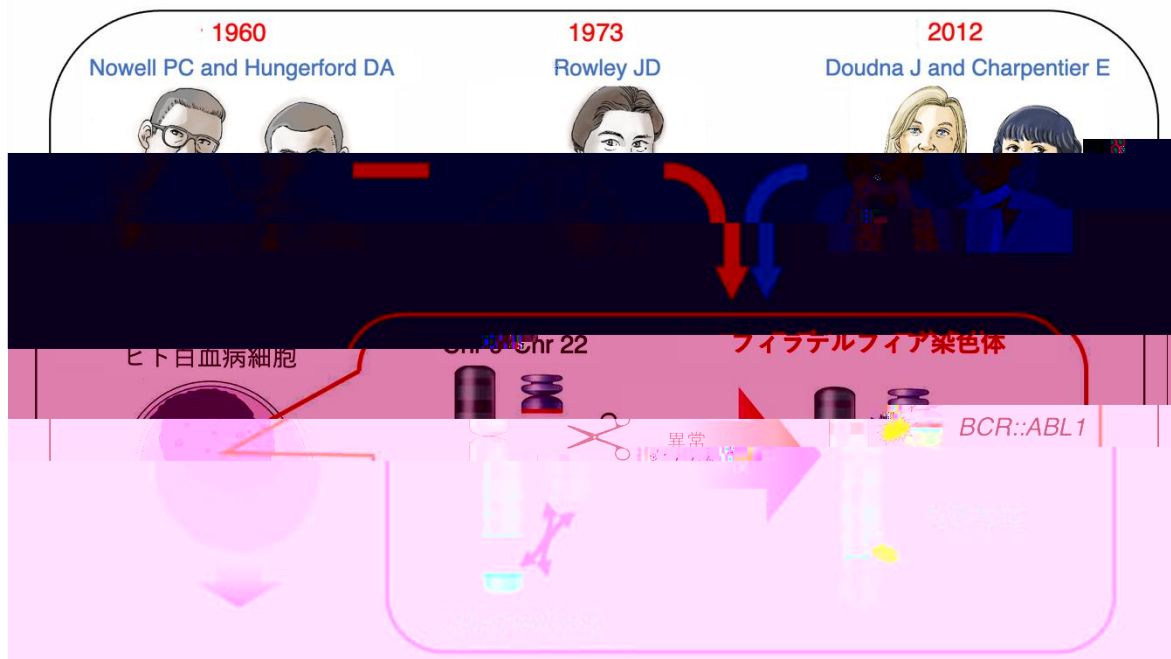
Janet Rowley 9 22
9 *ABL1* 22 *BCR*
BCR::ABL1 ()
CML (Acute lymphoblastic leukemia: ALL)
BCR::ABL1 *BCR::ABL1*

BCR::ABL1
CML ALL

9 *ABL1* 22 *BCR*
ABL1 *BCR*

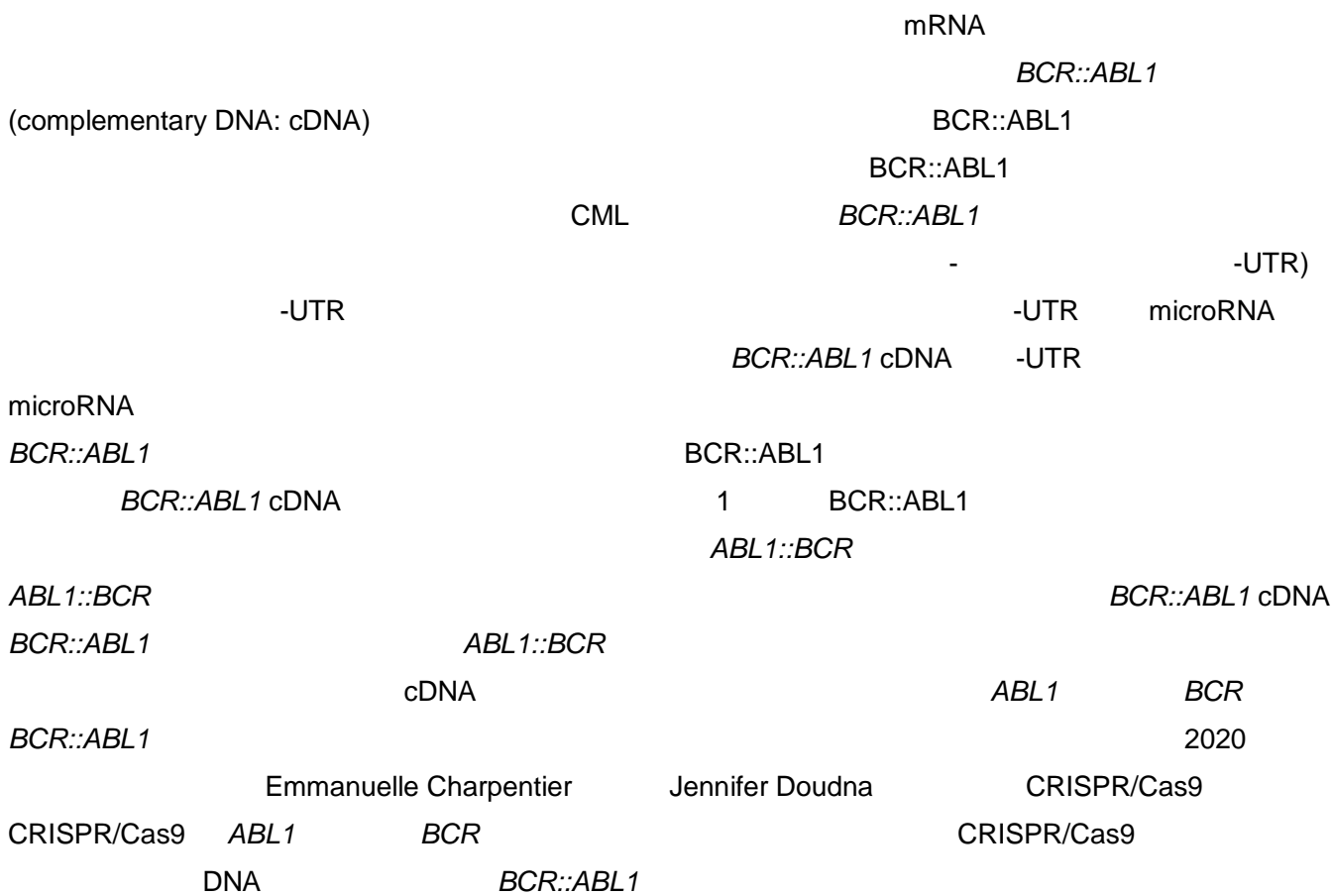
Jennifer Doudna 2012 Emmanuelle Charpentier
CRISPR/Cas9 CRISPR/Cas9 2020

(GM-CSF) TF-1 TF-1
TF-1 *ABL1* *BCR* CRISPR/Cas9
TF-1



1. BCR::ABL1

CRISPR/Cas9



2 ABL1 2 BCR::ABL1 BCR 13 15 2 p210 BCR::ABL1 p190 BCR::ABL1

ABL1 p210 BCR::ABL1 *BCR* 13
 1 CRISPR/Cas9
BCR::ABL1 *BCR::ABL1*
 TF-1 TF-1 *BCR* GM-CSF
 1 CRISPR/Cas9 GM-CSF 13 *ABL1*
 TF-1 GM-CSF CRISPR/Cas9 GM-
 CSF CRISPR/Cas9 *BCR*
ABL1 *BCR::ABL1* *ABL1::BCR*
 (3A) Western Blot p210 BCR::ABL1
 (3B) Fluorescence in situ hybridization (FISH) *BCR::ABL1*
ABL1::BCR
 (3C) *BCR* 1 *ABL1* 1
 CRISPR/Cas9 TF-1 p190 BCR::ABL1
)

BCR::ABL1
BCR::ABL1 cDNA CRISPR/Cas9
 p190 BCR::ABL1 BCR::ABL1 p210
 CML BCR::ABL1

●
 ●
 ●
 mRNA mRNA
 9 22 22 2

GM-CSF Granulocyte-macrophage colony stimulation factor

microRNA 20 25 RNA

JSPS JP21K15528 JP19K08833 JP19H03615

