A new defense system against viruses and genetic elements, defined as CRISPR has recently been discovered in Bacteria and Archaea. Its occurrence in more than half of the bacterial genomes and in most archaeal genomes demonstrates its wide distribution and potential importance for prokaryotic populations. The activity of CRISPR has so far only been demonstrated in three Bacteria, while its action has remained elusive in Archaea due to the lack of suitable \textit{in vivo} test systems based on recombinant virus or plasmid genomes.

Here we describe a novel \textit{in vivo} system based on the virus SSV1 and one of its natural hosts, the hyperthermophilic model archaeon \textit{Sulfolobus solfataricus} strain P2. By introducing targets of the \textit{S. solfataricus} CRISPR locus into recombinant SSV1 viruses, we have shown the activity of the immune system and can quantify it in plaque assays. Our experiments demonstrate for the first time \textit{in vivo} activity of CRISPR in archaea and the system will help to elucidate properties of the immune defense mechanism and to get new insights into virus-host CRISPR-driven evolution.