The disclosure provides adenosine deaminases that are capable of deaminating adenosine in DNA. The disclosure also provides fusion proteins comprising a Cas9 (e.g., a Cas9 nickase) domain and adenosine deaminases that deaminate adenosine in DNA. In some embodiments, the fusion proteins further comprise a nuclear localization sequence (NLS), and/or an inhibitor of base repair, such as, a nuclease dead inosine specific nuclease (dISN).