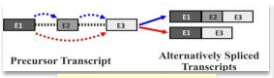
**Generation of structural and functional diversity of superoxide dismuatase (SOD) in salt tolerant rice by the alternative splicing has been demonstrated.**

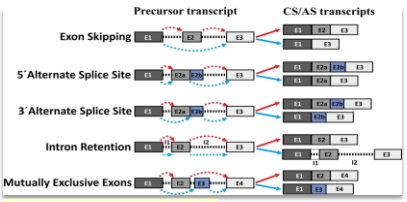
The molecular basis of salinity tolerance in rice was investigated and found that salt tolerant cultivars of rice produces greater diversity of superoxide dismutase an enzyme responsible for detoxification of reactive oxygen species. Comparative studies with salt sensitive cultivars suggested the functional significance of SODs in salt tolerance of rice. The SOD diversity was found to be due to splice variants of the original enzyme. All these variants have been functionally and structurally characterized. Molecular basis of SOD diversity generation and the factor that controls alternate splicing in rice is being investigated.

❑ Alternative Splicing (AS) generates multiple transcript/ protein from one gene

- **AS affects 60-90% genes in eukaryotes**
  - *enhances transcriptome & proteome diversity, regulates genes expression, affects stability, localization, function of RNA & proteins*
  - *involved in cellular functions, stress responses & 'stress memory'*

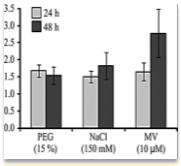


Alternative splicing

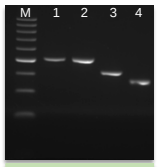


Different AS events in eukaryotes *Adapted from Sanyal et al., 2018*

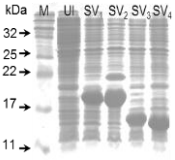
❑ **Functional characterization of SOD splice variant RNA/protein isoforms of Rice**



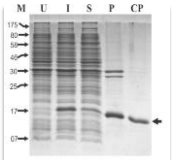
Stress responsiveness of a rice SOD SV



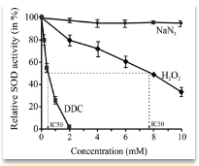
Full-length cDNA isolation of SOD SVs



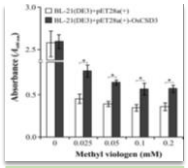
Cloning & Overexpression of rice SOD SV isoforms



Purification of a rice SOD SV isoform



SOD inhibitor analysis of a rice SOD isoform



*In vivo* function assessment of a rice SOD isoform

AS regulates SOD transcript levels and generates domain heterogeneity important in SOD regulation/functioning