High yield *in vivo* production of pure 6S ncRNA pave the path to explore its conformational changes

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ABSTRACT

The non-coding RNA 6S is a master cell cycle regulator in bacteria that binds to the RNA polymerase-σ^{70} holoenzyme during the stationary phase inhibiting transcription from the primary σ factor [1][2].This inhibition is reversed on the outgrowth from the stationary phase by synthesis of small product RNAs[1][2]. We conducted structural characterization of the free 6S and in complex with pRNA using Small Angle X-ray Scattering. The fairly linear and extended free 6S experiences a drastic conformational change upon synthesizing pRNA and undergoes a compaction of the overall size of the molecule and expansion of the central domain, rendering it incompatible to binding to RNA polymerase-σ^{70}. The experimentally-validated 3D models paint a much clearer picture on the way 6S regulation is performed in this simple but elegant system. Moreover, this 3D structural analysis was facilitated by the high RNA production yield of our *in vivo* overexpression approach. The recent developments in the use of RNA in pharmaceutical products, such as the SARS-CoV2 vaccines urge us to suggest the more widespread adoption of such approaches for cheaper and more efficient RNA production.

REFERENCES

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