Figure S1: List of primers used to make the *Hp nanos* constructs

Figure S2: List of primers used to make the Sp nanos constructs

Figure S3: *Hp* GNARLE is functionally homologous to *Sp* GNARLE. Synthetic mRNAs containing *GFP* open reading frame were injected in *Sp* fertilized eggs. The *GFP* ORF was preceded by (A,B.C) *Hp nanos2* 5'UTR and followed by (A) *Hp nanos2* full length 3'UTR, (B) *Hp* GNARLE 3'UTR or (C) *Hp* ΔGNARLE 3'UTR. Each GFP mRNA was co injected with an mRNA containing *mCherry* ORF flanked

by (D,E,F) *Xenopus β-globin* 5' and 3'UTRs. GFP (green) and mCherry (red) fluorescence were assayed in mesenchyme blastula following microinjection of synthetic RNAs. For GFP images, A, B and C were obtained using the same settings (laser intensity, pin-hole opening) at the microscope. For mCherry images, all the pictures were taken using the same settings (D,E,F). Approximately one hundred blastulas were visualized after injection of each construct, the representative embryos are presented.

Figure S4: *Sp nanos2* 3'UTR leads to the degradation of the mRNA in all cells except for the small micromeres. Synthetic mRNA containing the *GFP* ORF surrounded by Sp *nanos2* 5' and 3'UTRs was injected in *Sp* fertilized eggs. Injected embryos were fixed at the following times after fertilization: (A) 7H, (B) 10H, (C) 12H, (D) 24H, and analyzed by *In situ* hybridization using a RNA *in situ* probe against GFP. Uninjected embryos were fixed at the same times (E, F, G, H) and used as controls.

Figure S5: Alignment of the NRRE between *Sp* and *Hp*. NRRE was defined in *Sp* sequence, and includes 59 nucleotides upstream, and 69 nucleotides downstream of GNARLE. (A) Alignment of the 59 upstream nucleotides of *Sp* with the corresponding *Hp* sequence. They share 70% identity. (B) Alignment of the 69 downstream nucleotides of *Sp* with the corresponding Hp sequence. They share 88% identity.

Figure S6: Injection of a Dicer morpholino did not alter the level of nanos transcript. Dicer morpholino was injected in *Sp* fertilized eggs. Embryos were collected at blastula stage, 24 hours post fertilization and subjected to qPCR analysis using primers against *Sp nanos2*. Mock embryos were injected with Texas Red dextrans.