

# Pharmacogenomic based miRNA Regulation in Tuberculosis: An Initiation towards the Discovery of Systemic Biomarkers to Treat Tuberculosis in Future

*Department of Bioinformatics, Sathyabama University, Chennai, India*

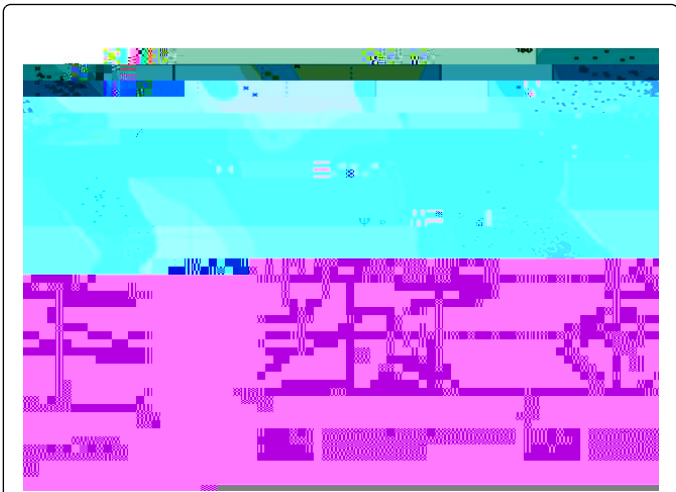
Harishchander Anandaram, Department of Bioinformatics, Sathyabama University, Chennai, India, Tel: +919940066227; E-mail: harishchander.a@gmail.com

June 11, 2018;

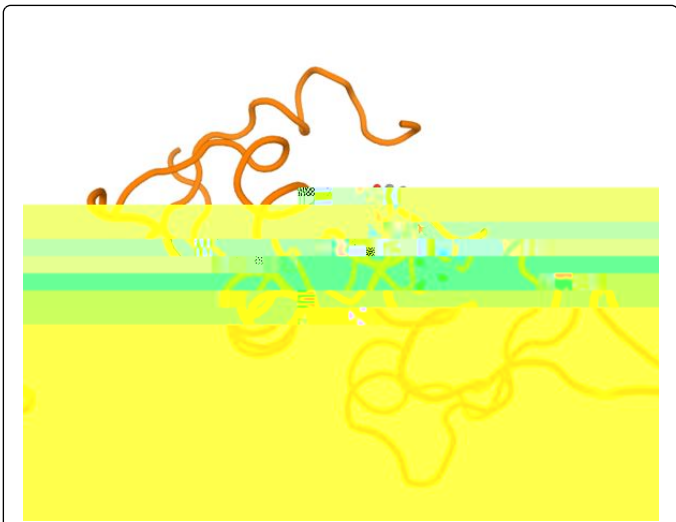
July 03, 2018;

July 10, 2018

© 2018 Anandaram H. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted



: [[i fY&:JU]XU]cb'cZ< B: %5' ]b'Flu dU'YGfj'Y'f'fi +1 'cZ'fYgX'Yg ]b'U'ck'YX'fY' ]cb'cZ'Flu' U'W'Ub'X'Ub'D'c'f'E'



: [[i fY'. '8cWXX'Wa d'Y' 'cZ'F'Z'a d]b' '5b'Uc[ 'f'n]b'W'X'U'U'U'g'Y' =>X +%(-) &S' k ]h' 'h'Y' d'f'Y'X'W'X' g'f'i' W'f'Y' cZ < B: %5' ]b' 'A' H= 5i' h'c'8'c'W'k ]h' 'U'a ]b]a i a 'Y'b'f[ n'c'Z] " -"

5'bcj'Y'U'd'f'c'U'W'lc' ]X'b]Z'n'U'h'Y'f'U'd'Y' h]W'f]f'Y'h'k'U'g' ]b]h]U'X' ]b' h]g' a'U'bi'g'W'd'h' 'b' ]h]g' U'd'f'c'U'W'z' h'c' 'bcj'Y' 'h'Y'f'U'd'Y' h]W'f]f'Y'g' f'k' B: %5' 'U'b'X' ]g]a ]f]!)%& d'E'c'X]U' ]bc'g'Y'U'b'X'h'Y'U'h'i' V'f'W'c'g'g'k'Y'Y' i'd'e'n't'i'f'ed' 'V'n'U'f'U' ]cb'U' U'd'f'c'U'W'c'Z'X'U'a ]b]b] 'k ]h' 'V'c]b'Z'f'a' U]W'g' Q'b'W' k'Y' X'c' 'b'c'h' \U'Y' U' W'g]U' 'g'f'i' W'f'Y' cZ < B: %5'z' \ca' c'c]m' a' c'X'Y' ]b] 'k'U'g'X'c'b'Y'U'b'X'h'Y'V'g'h'U'b'U'c' ]c'Z'f'Z'a' d]W'b'f'n]b'V'X'U'U'g'Y' =>X +%(-) &S' k'U'g' X'c'W'X' k ]h' '< B: %5' 'lc' 'f'nd' 'h'Y' W'a' d]U' ]l'm'c'Z' V]b'X' ]b] 'U'b'X' 'h'Y' a' c'W'Y' \U'Y' U' a'U' ]a' i a' 'd'f'c'U'U' ]l'm'c'Z' V'W'g'X'f'Y'X'U'g'U' 'Y'X'a' c'W'Y' ]b] 'h'Y' d'f'c'W'g'g'c'Z'f'U' ]cb' 'X'i' [ 'X'g] ]b'c'Z' h' V'f'W'c'g'g'

References

% GU \_\_cbYb'>=7'c\ b'8@\_U'g' Y'FA'z'G'W'Y'b'\_Y'f'G'>f'W'>5'z'Y'i'U''f'r'8'S'L' 5'b'of' c'ial'5'H'G'g]h'a' Y'h'\Y'd'U'c'el' ]W'm'c'Z'U'b]h'i' V'f'W'c'g'g'h'Y'f'U'd'i'n'5'a' >F'Y'g]f'f'7]h'7'U'f'Y'a'Y'X'%'(-)!'-)&

&' < ]i'W' ]B'z'H'X'U'f'U' ]B'z'M'b]U' ]U'f'U'?z: i' ]i'g' ]a'U'?z'G' n't'a' U' ]B'z'Y'i'U''f'r'8'S'+L' B'5'H'& '\*5'z'U' \U'd'c'h'nd'Y' c'Z'h'Y' B'!U'W'm'f'U'bg'z'f'U'g'Y' & ]Y'b'z' ]g' ]b' ]a' d'c'f'U'b]i' V'c'a' U'f'\_Y'f' 'Z'f' ]f'g' : c'Z' U'b]h'i' V'f'W'c'g'g' 'X'f'i' [ ]b'X' W'X' \Y'd'U'c'el' ]W'm' ]b' 'd'U'Y'b]g' d'U'Y'b]g' k ]h' 'h' i' V'f'W'c'g'g' 'K' c'f'X' > ; U'g'f'c'Y'h'h'f'c'`%'.'\*SS'!'\*SS' "

'" 7'c' < z' ? c' \ 'K' z' F'n'i' 'M'z' ? ]' 7'c'z' B'U'a' 'A' < z' Y'i'U''f'r'8'S'+L' ; Y'b]Y]W' d'c'na' c'f'd' ]g'a' g'c'Z' B'5'H'& ; U'b'X' 7'M'D'8'9%'U'g'g'V'U'X'k ]h' 'U'b]h'i' V'f'W'c'g'g' 'X'f'i' [ ]b'X' W'X' \Y'd'U'c'el' ]W'm' ]b' 'c'f'Y'U'b' d'U'Y'b]g' k ]h' 'd'i' a' c'b'U'f'm' h'i' V'f'W'c'g'g' 'H' V'f'W'c'g'g' , + )%&)"
(" D:gg' Y'c'@' z'7'U'g'Y'U'b'>5'z'X'Y'6]f'lc' 'H'7'z'F' ]W'f'c' '5'K'z'7'U'f'i' b'Y'D'z' Y'i'U''f'r'8'S' 'L' 5'g'g'V'U' ]cb' 'c'Z'g'c'k' 'B'!U'W'm'f'U'bg'z'f'U'g'Y' & 'p'ro'f'le' 'U'b'X' U'b]h'i' H'6' 'X'f'i' [ ]b'X' W'X' \Y'd'U'c'el' ]W'm' ]b' d'U'Y'b]g'Z'c'a' 'G'c'i' h'Y'b'6'f'U'g' '9'i' f'>7' ]b' D'U'f'a' U'W'\*(. '\*+!'\*, %
)" < i'U' ]b' ]M'z'7' Y'b' < 8'z'G' 'K' z'K'i' '>7'z'@'U'G'z'Y'i'U''f'r'8'S'+L' d'c'na' c'f'd' ]g'a' c'Z'h'Y' B'!U'W'm'f'U'bg'z'f'U'g'Y' & ]Y'b'Y'U'g'g'Y'd'U' ]l'm'f'g' : Z'M'f' 'Z'f' U'b]h'i' V'f'W'c'g'g'X'f'i' [ ]b'X' W'X' \Y'd'U'c'el' ]W'm' ]b' 'd'U'Y'b]g' < Y'd'U'c'c' ]m' ) ; , ' ! , - "
\*" J'i' ]'Y'a' ]Y'f' 'B'z'F'c'g]Y'f' 'A' : z'7' ]U'd'Y' 5'z'8'Y' ]c'i' a' c]g' : z'8'U'Y'f' 'D'z' Y'i'U''f'r'8'S' 'L' 7'M'D'8'9%' ]Y'b'c'h'nd'Y' U'b'X' ]g'c'b]U' ]X' ]b'X' W'X' \Y'd'U'c'el' ]W'm' ]b' d'U'Y'b]g'f'Y'U'X'Z'f' 'U'bh'h'i' V'f'W'c'g'g' '9'i' f'>7' ]b' D'U'f'a' U'W'\*( &!'(& "
+" A' ]W'Y'>'F'z'T' o'g'e'ir's's'on'1' D'E'6' U'W'a' z'h'a' V'Y'>'>5'z'G'c'X' ]f'U'g'K' F'z'Y'i'U''f'r'8'+) 'L' b'W'W'g'X' ]b'V'X'Y'W' c'Z' ]g'c'b]U' ]X' \Y'd'U'c'el' ]b' ]f'U' ]X' U'W'm'U'c'f'g' d'c'g]V'Y' f'Y'U' ]cb' 'lc' '\n'X'U' ]n'Y' a' Y'U'c' ]h'g' '7' ]b' D'U'f'a' U'W' 'T' e'r'`%' . +S'+ "
, " : f'h'U'b'X' 5'z' L'ef' 'A'5'z' 8'c'' 'A'5'z' < Y'b' '8'K' 'f'r'8'S'+L' : i' b'W' ]cb'U' W'f'U'W'f' ]n'U' ]cb' 'c'Z' \i' a' U'b' 'B'!U'W'm'f'U'bg'z'f'U'g'Y' & 'f'B'5'H'& 'g' ]b' ]Y' b'i' W'c'h]X'Y' d'c'na' c'f'd' ]g'a' g' D'U'a' U'W' ]Y'b]Y]W' ]b'X' ; Y'b'c'a' ]W'g'%'&S'!&S' "
-" 9'i' [ ]b' ]U'D'E'8'U' ]X'B'7'z'9' Y'b'U'>G'z'c'f'6'F' f'r'8'S'%'L' ; Y'b]Y]W' ]b] ; Y'b'c'a' ]W'6'f'U' ; Y'b]Y'f'g'>h'h'8'S'%' '\*(-' \*S' "
%\$' N'U'b' ]'M'z' 8'c'' 'A'5'z' N'U'c' 'G'z'G'U' ]h'g'>7'z' < Y'b' '8'K' 'f'r'8'S'+L' : i' b'W' ]cb'U' W'f'U'W'f' ]n'U' ]cb' 'c'Z'g' ]b' ]Y' b'i' W'c'h]X'Y' d'c'na' c'f'd' ]g'a' g' U'b'X' \U'd'c'h'nd'Y' c'Z' \i' a' U'b' 'B'!U'W'm'f'U'bg'z'f'U'g'Y'7'U'f'U' ]c' ]Y'b]Y]g' & '%\*'!%&+%
%%' K'U'\_Y'f' ?z' ; ]b'g'Y'f' ] ; z' < U'h]g' 8'z' < b'g' 8'c'Z' ; i' n'c'h'b' ?N'z' Y'i'U''f'r'8'S' 'L' ; Y'b]Y]W' d'c'na' c'f'd' ]g'a' ' ]b' 'B'!U'W'm'f'U'bg'z'f'U'g'Y' f'B'5'H'& 'd'c'd'i' U' ]cb' X'g'f' ]W' ]h'c'b'c'Z' B'5'H'& ; U'b'X' B'5'H'& ; U'W' ]h'h'i'>f'el' ]W' '9'b] ]f'c'b' < Y'U'h' '6'7'f' ]h' F'Y' %& ; ((S'!+& "
%&' ; f'c'g]h'i' < z' F'c'g]h'h'U' 'A'z' N'U'b' ]'A'z' B'i' Y'a' V'f' ]Y'f' '9@' f'r'8'S' 'L' 8'c'g]f' ]f'U' ]b] 'W'a' d'U' ]g'c'b' 'c'Z'f'Z'a' d]b' 'U'b'X' f'Z'a'Y'h]b]Y' ]b' 'W'a' V]b'U' ]cb' k ]h' ]g'c'b]U' ]X' U'b'X' d'n'U' ]b't'a' ]X'Y' ]b' 'h'Y' a' c'i'g'Y' a' c'X'Y' 'c'Z' h'i' V'f'W'c'g'g' '5'b]h'a' ]W'c'V'5' ]Y'b]g'7' \Y'a' c'h'Y'f' ) \* (' % (S' "
%" X'h'f'U'a' 'F'G' ; U'b'U'f' 'D'z' ?U'f' '6'z'G'f'g' '6'B'z' A'U' ]g'a' 'F'z' Y'i'U''f'r'8'S' 'L' D'U'f'a' U'W' ]b]Y]W'g' d'U'f'a' U'W'X'n'b'U'a' ]W'c'Z'f'Z'a' d]b' ]b'U'f'U'f'c'g' ' ]b'Z'W' ]cb' a' c'X'Y' c'Z'h'i' V'f'W'c'g'g' '5'b]h'a' ]W'c'V'5' ]Y'b]g'7' \Y'a' c'h'Y'f' (+: %&!'&S' "
%" > ]G'z' ]r'uf' o't' P'e'not' 7'z'@'U'W'c' ]l' 7'z'F'U' ] ] ]c'b'Y'a' 7'z'c'f'f' ]Y'b'F'z'Y'i'U''f'r'8'- 'L' E'f'e'c't'i'v'e'n'e's's' 'c'Z' f'Z'a' d]b'z' f'Z'U' ]h'z' U'b'X' f'Z'a'Y'h]b]Y' 'Z'f' d'f'Y' Y'b]h]Y' h'Y'f'U'd'ic'Z'h'i' V'f'W'c'g'g' ]b'a' ]W'5'a' F'Y' F'Y'g]f'f'8' ]g'%' , % ( % ( \* ( "
%)" F'c'g]h'h'U' 'A'z'K' ]' ]U'a' g' ?z' H'h' ] ] 'G'z' D'Y'c'e'i' ]b' '7'5'z'Y'f'c'b' '5'5'z' Y'i'U''f'r'8'S' 'L' D'c'h'h'h'i'k' ]W'k'Y'Y' 'm'f'Z'a'Y'h]b]Y' ]W' ]b] ]b] ]f'Y' ]a' Y'g' ]b' 'a' i' f]b]Y' h'i' V'f'W'c'g'g' '5'a' >F'Y'g]f'f'7'f]h'7'U'f'Y'a'Y'X'%'(-)!'(%& "
%\*" 7'c'i' X'f' ]G'z' < U'k' 'Y'b' 'A'z' ; U'h'i' U'G'z' A' ]b'n]f' ] ; C'z'K'U'h' ]b]g'K'z' Y'i'U''f'r'8'- +L' D'U'f'a' U'W' ]b]Y]W'g' c'Z' U'b]h'a' n'W'U'W'f' ]U'X'f'i' ]g' ]b' d'U'Y'b]g' k ]h' h'i' V'f'W'c'g'g'z'5'8'G'U'b'X'X' ]f'U'f'U'7' ]b'>z'W' ]8' ]g'%' %&!'(%& "
%" A'W'Y'c'b' < z'K'U'a' 'D'E'6'i'f' ]Y'f' '5'z' B'c'f'a' U'b'>z' : c'V'D'z'G'a' ]h' 'D' f'r'8'S' 'L' 8'Y'h'f'a' ]b]U'c'b' 'c'Z'f'Z'a' d]b'z' ]g'c'b]U' ]X'z' d'n'U' ]b't'a' ]X'Y' U'b'X' Y'h'U'a' V'lc' d'U'f'a' U'W' ]b]Y]W' ]b'U'W' \c'f'ic'Z'h'i' V'f'W'c'g'g'd'U'Y'b]g' '5'b]h'a' ]W'c'V'5' ]Y'b]g' 7' \Y'a' c'h'Y'f' ) S' %&S'!%&+ "
%" H'U'd'Y'c' 'K'z'6'f'U'z'f'X'K' N'z'5' ]Y'f'c'b' 'H'6'z' < c'd'Y'Y' 'D'E'F'Y' ]c' 'X'5'@'Y'i'U''f'r'8'S' 'L' G'f'i' a' 'W'b'W'f'U' ]c'g'c'Z'U'b]h'a' n'W'U'W'f' ]U'X'f'i' ]g' ]b' d'U'Y'b]g' k ]h' d'i' a' c'b'U'f'm'i' V'f'W'c'g'g' ]b'6'c]k'U'U'7' ]b'>z'W' ]8' ]g'%' (%(\*%(\*' "
%" J'U'b'7'f'Y'Y'F'z'5' ]g'U'V'U'b'U'6'z'X'Y'@'U' ]Y'K' 7'A'z'6'c'f'g'i'z'8'U'bi'g' ]b'c'g' < z'Y'h' U''f'r'8'S'+L'Y'f'