

# **Role of a Respiratory Burst Oxidase of *Lepidium sativum* (Cress) Seedlings in Root Development and Auxin Signaling**

Kerstin Müller<sup>1\*</sup>, Ada Linkies<sup>2\*</sup>, Gerhard Leubner-Metzger<sup>2,3</sup>, and Allison R. Kermode<sup>1,4</sup>

<sup>1</sup>Simon Fraser University, Department of Biological Sciences, 8888 University Drive, Burnaby BC V5A 1S6, Canada

<sup>2</sup>Albert-Ludwigs-University, Institute for Biology II, Faculty of Biology, University of Freiburg, Schänzlestr. 1, 79104, Freiburg, Germany

<sup>3</sup>Royal Holloway, University of London, School of Biological Sciences, Egham, Surrey, TW20, 0ZX, UK

\*Authors contributed equally to this work

<sup>4</sup>Author for correspondence: kermode@sfu.ca; Tel +1-778-782-3982; Fax 778-782-3496

**Supplementary Data**

**Supplementary Figure S1. Alignment of the deduced amino acid sequences of the AtrbohB and LesarbohB cDNAs.** Alignment of the AtrbohB amino acid sequence with that of its putative ortholog LesarbohB. EF hand, transmembrane and NOX/Duox like FAD/NADP binding domains of the two plant species were determined with the algorithm DELTA-BLAST (Domain Enhanced Lookup Time Accelerated BLAST) and are indicated in the alignment. Note that the amino acids are missing at the LesarbohB termini due to missing bases in the sequencing. Green fillings in the top panel and black fillings in the sequences represent identical amino acids between both sequences. The top panel with green filling also shows amino acid numbers.

**Supplementary Figure S2. Alignment of the deduced amino acid sequences of the AtrbohF and LesarbohF cDNAs.** Alignment of the AtrbohF amino acid sequence with that of its putative ortholog LesarbohF. EF hand, transmembrane and NOX/Duox like FAD/NADP binding domains of the two plant species were determined with the algorithm DELTA-BLAST (Domain Enhanced Lookup Time Accelerated BLAST) and are indicated in the alignment. Green fillings in the top panel and black fillings in the sequences represent identical amino acids between both sequences. The top panel with green filling also shows amino acid numbers.

Consensus Identity	1 X X X X X X X X X X X X X X X X X X X R C K A T G S X N X X E D X V E I T L E X R D
1. LesarbohB	1 20 30 40 R C K A T G S H N S E E D C V E I T L E A R D
2. AtrbohB	1 10 20 30 40 M R E E E M E S S S E G E T N K I S R C K A T G S D N P D E D E Y V E I T L E V R D
Consensus Identity	E X I X T M K X X A X L R S V X S G R L K T M V K S X S F A S R X L D R S K S X G
1. LesarbohB	32 42 52 62 E S I S T M K S R A A L R S V V S G R L K T M V K S M S F A S R K L D R S K S S G
2. AtrbohB	50 60 70 80 E T I N T M K A K A T L R S V L S G R L K T M V K S L S F A S R R L D R S K S F G
Consensus Identity	A X F A L R G L R F X A K N D A V G R G W D E V A X R X D X L A X X G K L P K S K
1. LesarbohB	72 82 92 102 A I F A L R G L R F T A K N D A V G R G W D E V A K R L D E L A I G G K L P K S K
2. AtrbohB	90 100 110 120 A M F A L R G L R F I A K N D A V G R G W D E V A M R F D K L A V E G K L P K S K
Consensus Identity	F G X C I G M X E S S E F V N E L X E A L V R R R G T T S S S I T K T E L X E F W
1. LesarbohB	112 122 132 142 F G R C I G M A E S S E F V N E L Y E A L V R R R G T T S S S I T K T E L S E F W
2. AtrbohB	130 140 150 160 F G H C I G M V E S S E F V N E L F E A L V R R R G T T S S S I T K T E L F E F W
Consensus Identity	E O I T G N S F D X R L O I F F D M V D K N L D G R I T G D E V K E I I A L S A S
1. LesarbohB	152 162 172 182 E O I T G N S F D A R L O I F F D M V D K N L D G R I T G D E V K E I I A L S A S
2. AtrbohB	170 180 190 200 E O I T G N S F D D R L O I F F D M V D K N L D G R I T G D E V K E I I A L S A S
Consensus Identity	A N K L S K I K E N V D E Y X A L I M E E L D X D N L G Y I E L H N L E T L L L O
1. LesarbohB	192 202 212 222 A N K L S K I K E N V D E Y V A L I M E E L D P D N L G Y I E L H N L E T L L L O
2. AtrbohB	210 220 230 240 A N K L S K I K E N V D E Y A A L I M E E L D R D N L G Y I E L H N L E T L L L O
Consensus Identity	V P S Q S N X N S P S S A N K R A L N K M L S O K L I P T K D R N P V K R X A X N
1. LesarbohB	232 242 252 262 V P S Q S N D N S P S S A N K R A L N K M L S O K L I P T K D R N P V K R Y A R N
2. AtrbohB	250 260 270 280 V P S Q S N - N S P S S A N K R A L N K M L S O K L I P T K D R N P V K R F A M N
Consensus Identity	X S Y F X L E N W X R I W V L T L W J S I C X X L F T W K F J O Y X R X T V F E V
1. LesarbohB	272 282 292 302 V S Y F L L E N W Q R I W V L T L W L S I C V A L F T W K F I O Y R R R T V F E V
2. AtrbohB	289 299 309 319 I S Y F F L E N W K R I W V L T L W I S I C I T L F T W K F L O Y K R K T V F E V
Consensus Identity	X G Y C V X V A K G S A E T L K F N M A L I L L P V C R N T I T W L R T X S K J X
1. LesarbohB	312 322 332 342 L G Y C V S V A K G S A E T L K F N M A L I L L P V C R N T I T W L R T N S K I V
2. AtrbohB	329 339 349 359 M G Y C V T V A K G S A E T L K F N M A L I L L P V C R N T I T W L R T K S K L I
Consensus Identity	G S V V P F D D N I N F H K V X A F G I A V G X X L H X I S H L A C D F P R L L H
1. LesarbohB	352 362 372 382 392 G S V V P F D D N I N F H K V I A F G I A V G V I L H S I S H L A C D F P R L L H
2. AtrbohB	369 379 389 399 409 G S V V P F D D N I N F H K V V A F G I A V G I G L H A I S H L A C D F P R L L H
Consensus Identity	A K N V X X E P X K X F F G X E R P X N Y G W F M K G X D G W T G V X M V V L M L
1. LesarbohB	402 412 422 432 A K N V A Y E P I K R F F G E E R P D N Y G W F M K G I D G W T G V I M V V L M L
2. AtrbohB	419 429 439 449 A K N V E F E P M K K F F G D E R P E N Y G W F M K G T D G W T G V T M V V L M L
Consensus Identity	V A Y V L A O S W F X R N R A N L P K S X K R L X G F N A F W Y S H H L F V I V Y
1. LesarbohB	442 452 462 472 V A Y V L A O S W F G R N R A N L P K S V K R L I G F N A F W Y S H H L F V I V Y
2. AtrbohB	459 469 479 489 V A Y V L A O S W F R R N R A N L P K S L K R L T G F N A F W Y S H H L F V I V Y
Consensus Identity	V L L I V H G Y F X Y L S K E W Y H K T T W M Y L A V P V L L Y A X E R L I R A F
1. LesarbohB	482 492 502 512 V L L I V H G Y F I Y L S K E W Y H K T T W M Y L A V P V L L Y A C E R L I R A F
2. AtrbohB	499 509 519 529 V L L I V H G Y F V Y L S K E W Y H K T T W M Y L A V P V L L Y A F E R L I R A F
Consensus Identity	R P G X K A V X V L K V A V Y P G N V L S L Y M S K P K G F K Y T S G O Y I Y X N
1. LesarbohB	522 532 542 552 R P G S K A V R V L K V A V Y P G N V L S L Y M S K P K G F K Y T S G O Y I Y V N
2. AtrbohB	539 549 559 569 R P G A K A V K V L K V A V Y P G N V L S L Y M S K P K G F K Y T S G O Y I Y I N
Consensus Identity	C S D V S P X Q W H P F S I T S A S G D D Y L S X H I R T L G D W T S O L K S L X
1. LesarbohB	562 572 582 592 C S D V S P F Q W H P F S I T S A S G D D Y L S I H I R T L G D W T S O L K S L F
2. AtrbohB	579 589 599 609 C S D V S P L Q W H P F S I T S A S G D D Y L S V H I R T L G D W T S O L K S L Y
Consensus Identity	S K V C O L X S X S O S G L F X X X X X X A N B I T R F P R L L I D G P Y G A P A
1. LesarbohB	602 612 617 627 S K V C O ? L S R S O S G L F M - - - - - A N D I T R F P R L L I D G P Y G A P A
2. AtrbohB	619 629 639 649 S K V C O L P S T S O S G L F I A D I G Q A N N I T R F P R L L I D G P Y G A P A
Consensus Identity	Q D Y R N Y B V L L L V G L G I G A T P L I S I R D V L N X I K N Q X S I E X X
1. LesarbohB	637 647 657 667 Q D Y R N Y N V L L L V G L G I G A T P L I S I R D V L N I I K N Q K S I E Q N
2. AtrbohB	659 669 679 689 Q D Y R N Y D V L L L V G L G I G A T P L I S I R D V L N N I K N Q N S I E R G
Consensus Identity	T N X H X X X X K X Y V A T K R A Y F Y W V T R E O G S L E W F S Z V M N E V A E
1. LesarbohB	677 687 697 707 T N N H N V S T K S Y V A T K R A Y F Y W V T R E O G S L E W F S Q V M N E V A E
2. AtrbohB	699 706 716 726 T N Q H - - - I K N Y V A T K R A Y F Y W V T R E O G S L E W F S E V M N E V A E
Consensus Identity	Y D S E G M I E L H N Y C T S V Y E E G D A R S A L I T M L O S L H H A K S G I D
1. LesarbohB	717 727 737 747 Y D S E G M I E L H N Y C T S V Y E E G D A R S A L I T M L O S L H H A K S G I D
2. AtrbohB	736 746 756 766 Y D S E G M I E L H N Y C T S V Y E E G D A R S A L I T M L O S L H H A K S G I D
Consensus Identity	I V S G T R V R T H F A R P B W R S V F K H V A V N H V N Q R V G V F Y C G N X C
1. LesarbohB	757 767 777 787 797 I V S G T R V R T H F A R P D W R S V F K H V A V N H V N Q R V G V F Y C G N A C
2. AtrbohB	776 786 796 806 816 I V S G T R V R T H F A R P N W R S V F K H V A V N H V N Q R V G V F Y C G N T C
Consensus Identity	J I X E L K R L A O D F S X X X X X X X X X X X X X X
1. LesarbohB	810 L I A E L K R L A O D F S
2. AtrbohB	826 843 I I G E L K R L A O D F S R K T T T K F E F H K E N F

Consensus	1	10	20	30	40	50
Identity	<b>M</b> X <b>P</b> F <b>S</b> K <b>X</b> D <b>R</b> R <b>R</b> W <b>S</b> F <b>D</b> S <b>V</b> S <b>A</b> <b>X</b> <b>X</b> <b>X</b> A <b>X</b> G <b>S</b> A <b>S</b> T <b>S</b> P <b>G</b> T <b>E</b> Y <b>S</b> <b>X</b> <b>X</b> G <b>X</b> <b>X</b> Z <b>E</b> F <b>V</b> E <b>V</b> T <b>I</b> D <b>L</b> O <b>D</b> D <b>D</b> T <b>I</b>					
1. AtrbohF	<b>M</b> K <b>P</b> F <b>S</b> K <b>N</b> D <b>R</b> R <b>R</b> W <b>S</b> F <b>D</b> S <b>V</b> S <b>A</b> <b>G</b> K <b>T</b> A <b>V</b> G <b>S</b> A <b>S</b> T <b>S</b> P <b>G</b> T <b>E</b> Y <b>S</b> I <b>N</b> G <b>-</b> D <b>Q</b> E <b>F</b> V <b>E</b> V <b>T</b> I <b>D</b> L <b>O</b> D <b>D</b> D <b>T</b> I					
2. LesarbohF	<b>M</b> R <b>P</b> F <b>S</b> K <b>H</b> D <b>R</b> R <b>R</b> W <b>S</b> F <b>D</b> S <b>V</b> S <b>A</b> E <b>R</b> N <b>A</b> I <b>G</b> S <b>A</b> S <b>T</b> S <b>P</b> G <b>T</b> E <b>Y</b> S <b>N</b> G <b>Y</b> G <b>E</b> E <b>F</b> V <b>E</b> V <b>T</b> I <b>D</b> L <b>O</b> D <b>D</b> D <b>T</b> I					
Consensus	60	70	80	90	100	110
Identity	<b>V</b> L <b>R</b> S <b>V</b> E <b>P</b> A <b>T</b> A <b>I</b> N <b>V</b> <b>X</b> <b>X</b> D <b>I</b> S <b>D</b> <b>X</b> <b>X</b> <b>X</b> <b>X</b> <b>X</b> <b>X</b> G <b>X</b> M <b>T</b> P <b>V</b> S <b>I</b> S <b>R</b> S <b>P</b> T <b>M</b> K <b>R</b> T <b>S</b> S <b>N</b> R <b>X</b> R <b>O</b> F <b>S</b> O <b>E</b> L <b>K</b>					
1. AtrbohF	<b>V</b> L <b>R</b> S <b>V</b> E <b>P</b> A <b>T</b> A <b>I</b> N <b>V</b> I <b>G</b> D <b>I</b> S <b>D</b> D <b>N</b> T <b>-</b> - <b>-</b> - <b>-</b> G <b>I</b> M <b>T</b> P <b>V</b> S <b>I</b> S <b>R</b> S <b>P</b> T <b>M</b> K <b>R</b> T <b>S</b> S <b>N</b> R <b>F</b> R <b>O</b> F <b>S</b> O <b>E</b> L <b>K</b>					
2. LesarbohF	<b>V</b> L <b>R</b> S <b>V</b> E <b>P</b> A <b>T</b> A <b>I</b> N <b>V</b> - <b>-</b> D <b>I</b> S <b>D</b> E <b>T</b> A <b>S</b> T <b>A</b> G <b>G</b> M <b>M</b> T <b>P</b> V <b>S</b> I <b>S</b> R <b>S</b> P <b>T</b> M <b>K</b> R <b>T</b> S <b>S</b> N <b>R</b> L <b>R</b> O <b>F</b> S <b>O</b> E <b>L</b> K					
Consensus	120	130	140	150	160	170
Identity	<b>A</b> E <b>A</b> V <b>A</b> K <b>A</b> K <b>O</b> L <b>S</b> O <b>E</b> L <b>K</b> R <b>F</b> S <b>W</b> S <b>R</b> S <b>F</b> S <b>G</b> X <b>L</b> T <b>T</b> T <b>X</b> <b>X</b> <b>X</b> <b>X</b> <b>X</b> <b>O</b> X <b>G</b> G <b>X</b> <b>X</b> G <b>G</b> L <b>V</b> N <b>S</b> A <b>L</b> E <b>A</b> R <b>A</b> L <b>R</b> K <b>O</b>					
1. AtrbohF	<b>A</b> E <b>A</b> V <b>A</b> K <b>A</b> K <b>O</b> L <b>S</b> O <b>E</b> L <b>K</b> R <b>F</b> S <b>W</b> S <b>R</b> S <b>F</b> S <b>G</b> N <b>L</b> T <b>T</b> T <b>T</b> S <b>T</b> A <b>N</b> O <b>S</b> G <b>G</b> A <b>G</b> G <b>G</b> L <b>V</b> N <b>S</b> A <b>L</b> E <b>A</b> R <b>A</b> L <b>R</b> K <b>O</b>					
2. LesarbohF	<b>A</b> E <b>A</b> V <b>A</b> K <b>A</b> K <b>O</b> L <b>S</b> O <b>E</b> L <b>K</b> R <b>F</b> S <b>W</b> S <b>R</b> S <b>F</b> S <b>G</b> T <b>L</b> T <b>T</b> T <b>N</b> - <b>-</b> - <b>H</b> O <b>N</b> G <b>G</b> - <b>-</b> G <b>G</b> L <b>V</b> N <b>S</b> A <b>L</b> E <b>A</b> R <b>A</b> L <b>R</b> K <b>O</b>					
Consensus	180	190	200	210	220	
Identity	<b>R</b> A <b>O</b> L <b>D</b> R <b>T</b> R <b>S</b> S <b>A</b> O <b>R</b> A <b>L</b> R <b>G</b> L <b>R</b> F <b>I</b> S <b>N</b> K <b>X</b> <b>X</b> <b>N</b> <b>X</b> D <b>G</b> W <b>N</b> D <b>V</b> O <b>S</b> N <b>F</b> E <b>K</b> <b>X</b> <b>X</b> K <b>N</b> G <b>Y</b> I <b>R</b> S <b>D</b> F <b>A</b> O <b>C</b> I <b>G</b>					
1. AtrbohF	<b>R</b> A <b>O</b> L <b>D</b> R <b>T</b> R <b>S</b> S <b>A</b> O <b>R</b> A <b>L</b> R <b>G</b> L <b>R</b> F <b>I</b> S <b>N</b> K <b>Q</b> K <b>N</b> V <b>D</b> G <b>W</b> N <b>D</b> V <b>O</b> S <b>N</b> F <b>E</b> K <b>F</b> E <b>K</b> N <b>G</b> Y <b>I</b> R <b>S</b> D <b>F</b> A <b>O</b> C <b>I</b> G					
2. LesarbohF	<b>R</b> A <b>O</b> L <b>D</b> R <b>T</b> R <b>S</b> S <b>A</b> O <b>R</b> A <b>L</b> R <b>G</b> L <b>R</b> F <b>I</b> S <b>N</b> K <b>R</b> T <b>N</b> F <b>D</b> G <b>W</b> N <b>D</b> V <b>O</b> S <b>N</b> F <b>E</b> K <b>L</b> S <b>K</b> N <b>G</b> Y <b>I</b> R <b>S</b> D <b>F</b> A <b>O</b> C <b>I</b> G					
Consensus	230	240	250	260	270	280
Identity	<b>M</b> K <b>D</b> S <b>X</b> E <b>F</b> A <b>L</b> E <b>L</b> F <b>D</b> A <b>L</b> S <b>R</b> R <b>R</b> <b>X</b> <b>X</b> V <b>E</b> K <b>I</b> N <b>H</b> D <b>E</b> L <b>Y</b> E <b>Y</b> W <b>S</b> O <b>I</b> N <b>D</b> E <b>S</b> F <b>D</b> S <b>R</b> L <b>O</b> I <b>F</b> F <b>D</b> I <b>V</b> D <b>K</b> N					
1. AtrbohF	<b>M</b> K <b>D</b> S <b>K</b> E <b>F</b> A <b>L</b> E <b>L</b> F <b>D</b> A <b>L</b> S <b>R</b> R <b>R</b> R <b>L</b> K <b>V</b> E <b>K</b> I <b>N</b> H <b>D</b> E <b>L</b> Y <b>E</b> Y <b>W</b> S <b>O</b> I <b>N</b> D <b>E</b> S <b>F</b> D <b>S</b> R <b>L</b> O <b>I</b> F <b>F</b> D <b>I</b> V <b>D</b> K <b>N</b>					
2. LesarbohF	<b>M</b> K <b>D</b> S <b>N</b> E <b>F</b> A <b>L</b> E <b>L</b> F <b>D</b> A <b>L</b> S <b>R</b> R <b>R</b> R <b>Q</b> R <b>V</b> E <b>K</b> I <b>N</b> H <b>D</b> E <b>L</b> Y <b>E</b> Y <b>W</b> S <b>O</b> I <b>N</b> D <b>E</b> S <b>F</b> D <b>S</b> R <b>L</b> O <b>I</b> F <b>F</b> D <b>I</b> V <b>D</b> K <b>N</b>					
Consensus	290	300	310	320	330	340
Identity	<b>E</b> D <b>G</b> R <b>I</b> T <b>E</b> E <b>V</b> <b>X</b> E <b>I</b> I <b>M</b> L <b>S</b> A <b>S</b> A <b>N</b> K <b>L</b> S <b>R</b> L <b>K</b> <b>X</b> O <b>A</b> E <b>E</b> Y <b>A</b> A <b>L</b> I <b>M</b> E <b>E</b> L <b>D</b> P <b>E</b> R <b>L</b> G <b>Y</b> I <b>E</b> L <b>W</b> O <b>L</b> E <b>T</b> L					
1. AtrbohF	<b>E</b> D <b>G</b> R <b>I</b> T <b>E</b> E <b>V</b> <b>K</b> E <b>I</b> I <b>M</b> L <b>S</b> A <b>S</b> A <b>N</b> K <b>L</b> S <b>R</b> L <b>K</b> E <b>O</b> A <b>E</b> E <b>Y</b> A <b>A</b> L <b>I</b> M <b>E</b> E <b>L</b> D <b>P</b> E <b>R</b> L <b>G</b> Y <b>I</b> E <b>L</b> W <b>O</b> L <b>E</b> T <b>L</b>					
2. LesarbohF	<b>E</b> D <b>G</b> R <b>I</b> T <b>E</b> E <b>V</b> <b>Q</b> E <b>I</b> I <b>M</b> L <b>S</b> A <b>S</b> A <b>N</b> K <b>L</b> S <b>R</b> L <b>K</b> D <b>O</b> A <b>E</b> E <b>Y</b> A <b>A</b> L <b>I</b> M <b>E</b> E <b>L</b> D <b>P</b> E <b>R</b> L <b>G</b> Y <b>I</b> E <b>L</b> W <b>O</b> L <b>E</b> T <b>L</b>					
Consensus	350	360	370	380	390	
Identity	<b>L</b> L <b>O</b> K <b>D</b> T <b>Y</b> L <b>N</b> Y <b>S</b> O <b>A</b> L <b>S</b> Y <b>T</b> S <b>O</b> A <b>L</b> S <b>O</b> N <b>I</b> <b>X</b> G <b>L</b> R <b>X</b> <b>X</b> S <b>R</b> I <b>H</b> R <b>M</b> S <b>S</b> D <b>X</b> V <b>Y</b> <b>X</b> <b>X</b> O <b>E</b> N <b>W</b> K <b>R</b> I <b>W</b> V <b>I</b> <b>X</b> I					
1. AtrbohF	<b>L</b> L <b>O</b> K <b>D</b> T <b>Y</b> L <b>N</b> Y <b>S</b> O <b>A</b> L <b>S</b> Y <b>T</b> S <b>O</b> A <b>L</b> S <b>O</b> N <b>L</b> Q <b>G</b> L <b>R</b> G <b>K</b> S <b>R</b> I <b>H</b> R <b>M</b> S <b>S</b> D <b>F</b> V <b>Y</b> I <b>M</b> O <b>E</b> N <b>W</b> K <b>R</b> I <b>W</b> V <b>I</b> S <b>L</b> I					
2. LesarbohF	<b>L</b> L <b>O</b> K <b>D</b> T <b>Y</b> L <b>N</b> Y <b>S</b> O <b>A</b> L <b>S</b> Y <b>T</b> S <b>O</b> A <b>L</b> S <b>O</b> N <b>L</b> H <b>G</b> L <b>R</b> Q <b>N</b> S <b>R</b> I <b>H</b> R <b>M</b> S <b>S</b> D <b>C</b> V <b>Y</b> F <b>I</b> O <b>E</b> N <b>W</b> K <b>R</b> I <b>W</b> V <b>I</b> F <b>L</b> I					
Consensus	400	410	420	430	440	450
Identity	<b>W</b> X <b>M</b> I <b>M</b> J <b>G</b> L <b>F</b> L <b>W</b> K <b>F</b> F <b>O</b> Y <b>K</b> O <b>K</b> D <b>A</b> F <b>H</b> V <b>M</b> G <b>Y</b> C <b>L</b> L <b>T</b> A <b>K</b> G <b>A</b> E <b>T</b> L <b>K</b> F <b>N</b> M <b>A</b> L <b>I</b> L <b>F</b> P <b>V</b> C <b>R</b> N <b>T</b> I <b>T</b> W					
1. AtrbohF	<b>W</b> I <b>M</b> I <b>M</b> I <b>G</b> L <b>F</b> L <b>W</b> K <b>F</b> F <b>O</b> Y <b>K</b> O <b>K</b> D <b>A</b> F <b>H</b> V <b>M</b> G <b>Y</b> C <b>L</b> L <b>T</b> A <b>K</b> G <b>A</b> E <b>T</b> L <b>K</b> F <b>N</b> M <b>A</b> L <b>I</b> L <b>F</b> P <b>V</b> C <b>R</b> N <b>T</b> I <b>T</b> W					
2. LesarbohF	<b>W</b> V <b>M</b> I <b>M</b> I <b>G</b> L <b>F</b> L <b>W</b> K <b>F</b> F <b>O</b> Y <b>K</b> O <b>K</b> D <b>A</b> F <b>H</b> V <b>M</b> G <b>Y</b> C <b>L</b> L <b>T</b> A <b>K</b> G <b>A</b> E <b>T</b> L <b>K</b> F <b>N</b> M <b>A</b> L <b>I</b> L <b>F</b> P <b>V</b> C <b>R</b> N <b>T</b> I <b>T</b> W					
Consensus	460	470	480	490	500	510
Identity	<b>L</b> R <b>S</b> T <b>R</b> L <b>S</b> Y <b>F</b> V <b>P</b> F <b>D</b> D <b>N</b> I <b>N</b> F <b>H</b> K <b>T</b> I <b>A</b> G <b>A</b> I <b>V</b> V <b>X</b> V <b>I</b> L <b>H</b> <b>X</b> G <b>D</b> H <b>J</b> A <b>C</b> D <b>F</b> P <b>R</b> I <b>V</b> R <b>A</b> T <b>E</b> Y <b>D</b> Y <b>N</b> R <b>Y</b> L					
1. AtrbohF	<b>L</b> R <b>S</b> T <b>R</b> L <b>S</b> Y <b>F</b> V <b>P</b> F <b>D</b> D <b>N</b> I <b>N</b> F <b>H</b> K <b>T</b> I <b>A</b> G <b>A</b> I <b>V</b> V <b>A</b> V <b>I</b> L <b>H</b> I <b>G</b> D <b>H</b> L <b>A</b> C <b>D</b> F <b>P</b> R <b>I</b> V <b>R</b> A <b>T</b> E <b>Y</b> D <b>Y</b> N <b>R</b> Y <b>L</b>					
2. LesarbohF	<b>L</b> R <b>S</b> T <b>R</b> L <b>S</b> Y <b>F</b> V <b>P</b> F <b>D</b> D <b>N</b> I <b>N</b> F <b>H</b> K <b>T</b> I <b>A</b> G <b>A</b> I <b>V</b> V <b>G</b> V <b>I</b> L <b>H</b> V <b>G</b> D <b>H</b> I <b>A</b> C <b>D</b> F <b>P</b> R <b>I</b> V <b>R</b> A <b>T</b> E <b>Y</b> D <b>Y</b> N <b>R</b> Y <b>L</b>					
Consensus	520	530	540	550	560	570
Identity	<b>F</b> H <b>Y</b> F <b>O</b> T <b>K</b> O <b>P</b> T <b>Y</b> <b>X</b> D <b>L</b> V <b>K</b> G <b>P</b> E <b>G</b> I <b>T</b> G <b>I</b> L <b>M</b> V <b>I</b> L <b>M</b> <b>X</b> I <b>S</b> F <b>X</b> L <b>A</b> T <b>R</b> W <b>F</b> R <b>N</b> L <b>V</b> K <b>L</b> P <b>X</b> P <b>F</b> D <b>R</b> L <b>T</b> G					
1. AtrbohF	<b>F</b> H <b>Y</b> F <b>O</b> T <b>K</b> O <b>P</b> T <b>Y</b> F <b>D</b> L <b>V</b> K <b>G</b> P <b>E</b> G <b>I</b> T <b>G</b> I <b>L</b> M <b>V</b> I <b>L</b> M <b>I</b> S <b>F</b> T <b>L</b> A <b>T</b> R <b>W</b> F <b>R</b> N <b>L</b> V <b>K</b> L <b>P</b> K <b>P</b> F <b>D</b> R <b>L</b> T <b>G</b>					
2. LesarbohF	<b>F</b> H <b>Y</b> F <b>O</b> T <b>K</b> O <b>P</b> T <b>Y</b> W <b>D</b> L <b>V</b> K <b>G</b> P <b>E</b> G <b>I</b> T <b>G</b> I <b>L</b> M <b>V</b> I <b>L</b> M <b>T</b> I <b>S</b> F <b>I</b> L <b>A</b> T <b>R</b> W <b>F</b> R <b>N</b> L <b>V</b> K <b>L</b> P <b>R</b> P <b>F</b> D <b>R</b> L <b>T</b> G					
Consensus	580	590	600	610	620	
Identity	<b>F</b> N <b>A</b> F <b>W</b> Y <b>S</b> H <b>H</b> L <b>F</b> <b>X</b> I <b>V</b> Y <b>X</b> L <b>L</b> I <b>L</b> H <b>G</b> J <b>F</b> L <b>Y</b> F <b>A</b> K <b>P</b> W <b>Y</b> V <b>X</b> T <b>T</b> W <b>M</b> Y <b>L</b> A <b>V</b> P <b>V</b> L <b>L</b> Y <b>G</b> G <b>E</b> R <b>T</b> L <b>R</b> Y <b>F</b> R					
1. AtrbohF	<b>F</b> N <b>A</b> F <b>W</b> Y <b>S</b> H <b>H</b> L <b>F</b> V <b>I</b> V <b>Y</b> I <b>L</b> L <b>I</b> L <b>H</b> G <b>I</b> F <b>L</b> Y <b>F</b> A <b>K</b> P <b>W</b> Y <b>V</b> R <b>T</b> T <b>W</b> M <b>Y</b> L <b>A</b> V <b>P</b> V <b>L</b> L <b>Y</b> G <b>G</b> E <b>R</b> T <b>L</b> R <b>Y</b> F <b>R</b>					
2. LesarbohF	<b>F</b> N <b>A</b> F <b>W</b> Y <b>S</b> H <b>H</b> L <b>F</b> I <b>I</b> V <b>Y</b> V <b>L</b> L <b>I</b> L <b>H</b> G <b>I</b> F <b>L</b> Y <b>F</b> A <b>K</b> P <b>W</b> Y <b>V</b> H <b>T</b> T <b>W</b> M <b>Y</b> L <b>A</b> V <b>P</b> V <b>L</b> L <b>Y</b> G <b>G</b> E <b>R</b> T <b>L</b> R <b>Y</b> F <b>R</b>					
Consensus	630	640	650	660	670	680
Identity	<b>S</b> G <b>S</b> Y <b>S</b> V <b>R</b> L <b>L</b> K <b>V</b> A <b>I</b> Y <b>P</b> G <b>N</b> V <b>L</b> T <b>L</b> O <b>M</b> S <b>K</b> P <b>X</b> O <b>F</b> R <b>Y</b> K <b>S</b> G <b>O</b> Y <b>M</b> F <b>V</b> O <b>C</b> P <b>A</b> V <b>S</b> P <b>F</b> E <b>W</b> H <b>P</b> F <b>S</b> I <b>T</b> S <b>A</b>					
1. AtrbohF	<b>S</b> G <b>S</b> Y <b>S</b> V <b>R</b> L <b>L</b> K <b>V</b> A <b>I</b> Y <b>P</b> G <b>N</b> V <b>L</b> T <b>L</b> O <b>M</b> S <b>K</b> P <b>T</b> O <b>F</b> R <b>Y</b> K <b>S</b> G <b>O</b> Y <b>M</b> F <b>V</b> O <b>C</b> P <b>A</b> V <b>S</b> P <b>F</b> E <b>W</b> H <b>P</b> F <b>S</b> I <b>T</b> S <b>A</b>					
2. LesarbohF	<b>S</b> G <b>S</b> Y <b>S</b> V <b>R</b> L <b>L</b> K <b>V</b> A <b>I</b> Y <b>P</b> G <b>N</b> V <b>L</b> T <b>L</b> O <b>M</b> S <b>K</b> P <b>S</b> O <b>F</b> R <b>Y</b> K <b>S</b> G <b>O</b> Y <b>M</b> F <b>V</b> O <b>C</b> P <b>A</b> V <b>S</b> P <b>F</b> E <b>W</b> H <b>P</b> F <b>S</b> I <b>T</b> S <b>A</b>					
Consensus	690	700	710	720	730	740
Identity	<b>P</b> E <b>D</b> B <b>Y</b> I <b>S</b> I <b>H</b> I <b>R</b> <b>Z</b> L <b>G</b> D <b>W</b> T <b>O</b> E <b>L</b> K <b>X</b> <b>X</b> F <b>S</b> E <b>V</b> C <b>Z</b> P <b>P</b> V <b>X</b> G <b>K</b> S <b>G</b> L <b>L</b> R <b>A</b> D <b>E</b> <b>X</b> T <b>K</b> <b>X</b> S <b>L</b> P <b>K</b> L <b>L</b> I <b>D</b> G <b>P</b>					
1. AtrbohF	<b>P</b> E <b>D</b> D <b>Y</b> I <b>S</b> I <b>H</b> I <b>R</b> Q <b>L</b> G <b>D</b> W <b>T</b> O <b>E</b> L <b>K</b> R <b>V</b> F <b>S</b> E <b>V</b> C <b>E</b> P <b>P</b> V <b>G</b> G <b>K</b> S <b>G</b> L <b>L</b> R <b>A</b> D <b>E</b> T <b>T</b> K <b>K</b> S <b>L</b> P <b>K</b> L <b>L</b> I <b>D</b> G <b>P</b>					
2. LesarbohF	<b>P</b> E <b>D</b> N <b>Y</b> I <b>S</b> I <b>H</b> I <b>R</b> E <b>L</b> G <b>D</b> W <b>T</b> O <b>E</b> L <b>K</b> K <b>K</b> F <b>S</b> E <b>V</b> C <b>Q</b> P <b>P</b> V <b>A</b> G <b>K</b> S <b>G</b> L <b>L</b> R <b>A</b> D <b>E</b> S <b>T</b> K <b>T</b> S <b>L</b> P <b>K</b> L <b>L</b> I <b>D</b> G <b>P</b>					
Consensus	750	760	770	780	790	
Identity	<b>Y</b> G <b>A</b> P <b>A</b> O <b>D</b> Y <b>X</b> K <b>Y</b> D <b>V</b> L <b>L</b> L <b>V</b> G <b>L</b> G <b>I</b> G <b>A</b> T <b>P</b> F <b>I</b> S <b>I</b> L <b>K</b> D <b>L</b> L <b>N</b> N <b>I</b> V <b>K</b> M <b>E</b> E <b>H</b> A <b>D</b> S <b>I</b> S <b>D</b> F <b>S</b> R <b>S</b> S <b>E</b> <b>X</b> S					
1. AtrbohF	<b>Y</b> G <b>A</b> P <b>A</b> O <b>D</b> Y <b>R</b> K <b>Y</b> D <b>V</b> L <b>L</b> L <b>V</b> G <b>L</b> G <b>I</b> G <b>A</b> T <b>P</b> F <b>I</b> S <b>I</b> L <b>K</b> D <b>L</b> L <b>N</b> N <b>I</b> V <b>K</b> M <b>E</b> E <b>H</b> A <b>D</b> S <b>I</b> S <b>D</b> F <b>S</b> R <b>S</b> S <b>E</b> Y <b>S</b>					
2. LesarbohF	<b>Y</b> G <b>A</b> P <b>A</b> O <b>D</b> Y <b>M</b> K <b>Y</b> D <b>V</b> L <b>L</b> L <b>V</b> G <b>L</b> G <b>I</b> G <b>A</b> T <b>P</b> F <b>I</b> S <b>I</b> L <b>K</b> D <b>L</b> L <b>N</b> N <b>I</b> V <b>K</b> M <b>E</b> E <b>H</b> A <b>D</b> S <b>I</b> S <b>D</b> F <b>S</b> R <b>S</b> S <b>E</b> H <b>S</b>					
Consensus	800	810	820	830	840	850
Identity	<b>T</b> G <b>S</b> N <b>X</b> <b>X</b> T <b>P</b> R <b>R</b> K <b>X</b> I <b>L</b> L <b>K</b> T <b>T</b> N <b>A</b> Y <b>F</b> Y <b>W</b> V <b>T</b> R <b>E</b> O <b>G</b> S <b>F</b> D <b>W</b> F <b>K</b> G <b>V</b> M <b>N</b> E <b>V</b> A <b>E</b> L <b>D</b> O <b>R</b> G <b>V</b> I <b>E</b> M <b>H</b> N <b>Y</b> L <b>T</b>					
1. AtrbohF	<b>T</b> G <b>S</b> N <b>G</b> D <b>T</b> P <b>R</b> R <b>K</b> R <b>I</b> L <b>L</b> K <b>T</b> T <b>N</b> A <b>Y</b> F <b>Y</b> W <b>V</b> T <b>R</b> E <b>O</b> G <b>S</b> F <b>D</b> W <b>F</b> K <b>G</b> V <b>M</b> N <b>E</b> V <b>A</b> E <b>L</b> D <b>O</b> R <b>G</b> V <b>I</b> E <b>M</b> H <b>N</b> Y <b>L</b> T					
2. LesarbohF	<b>T</b> G <b>S</b> N <b>S</b> E <b>T</b> P <b>R</b> R <b>K</b> K <b>I</b> L <b>L</b> K <b>T</b> T <b>N</b> A <b>Y</b> F <b>Y</b> W <b>V</b> T <b>R</b> E <b>O</b> G <b>S</b> F <b>D</b> W <b>F</b> K <b>G</b> V <b>M</b> N <b>E</b> V <b>A</b> E <b>L</b> D <b>O</b> R <b>G</b> V <b>I</b> E <b>M</b> H <b>N</b> Y <b>L</b> T					
Consensus	860	870	880	890	900	910
Identity	<b>S</b> V <b>Y</b> E <b>E</b> G <b>D</b> A <b>R</b> S <b>A</b> L <b>I</b> T <b>M</b> V <b>O</b> A <b>L</b> N <b>H</b> A <b>K</b> N <b>G</b> V <b>D</b> I <b>V</b> S <b>G</b> T <b>R</b> V <b>R</b> T <b>H</b> F <b>A</b> R <b>P</b> N <b>W</b> K <b>K</b> V <b>L</b> <b>X</b> K <b>L</b> S <b>S</b> K <b>H</b> <b>X</b> N <b>A</b>					
1. AtrbohF	<b>S</b> V <b>Y</b> E <b>E</b> G <b>D</b> A <b>R</b> S <b>A</b> L <b>I</b> T <b>M</b> V <b>O</b> A <b>L</b> N <b>H</b> A <b>K</b> N <b>G</b> V <b>D</b> I <b>V</b> S <b>G</b> T <b>R</b> V <b>R</b> T <b>H</b> F <b>A</b> R <b>P</b> N <b>W</b> K <b>K</b> V <b>L</b> T <b>K</b> L <b>S</b> S <b>K</b> H <b>C</b> N <b>A</b>					
2. LesarbohF	<b>S</b> V <b>Y</b> E <b>E</b> G <b>D</b> A <b>R</b> S <b>A</b> L <b>I</b> T <b>M</b> V <b>O</b> A <b>L</b> N <b>H</b> A <b>K</b> N <b>G</b> V <b>D</b> I <b>V</b> S <b>G</b> T <b>R</b> V <b>R</b> T <b>H</b> F <b>A</b> R <b>P</b> N <b>W</b> K <b>K</b> V <b>L</b> S <b>K</b> L <b>S</b> S <b>K</b> H <b>T</b> N <b>A</b>					
Consensus	920	930	940	950		
Identity	<b>R</b> I <b>G</b> V <b>F</b> Y <b>C</b> G <b>V</b> P <b>V</b> L <b>G</b> K <b>E</b> L <b>S</b> K <b>L</b> C <b>N</b> T <b>F</b> N <b>O</b> K <b>G</b> S <b>T</b> K <b>F</b> E <b>F</b> H <b>K</b> E <b>H</b> F					
1. AtrbohF	<b>R</b> I <b>G</b> V <b>F</b> Y <b>C</b> G <b>V</b> P <b>V</b> L <b>G</b> K <b>E</b> L <b>S</b> K <b>L</b> C <b>N</b> T <b>F</b> N <b>O</b> K <b>G</b> S <b>T</b> K <b>F</b> E <b>F</b> H <b>K</b> E <b>H</b> F					
2. LesarbohF	<b>R</b> I <b>G</b> V <b>F</b> Y <b>C</b> G <b>V</b> P <b>V</b> L <b>G</b> K <b>E</b> L <b>S</b> K <b>L</b> C <b>N</b> T <b>F</b> N <b>O</b> K <b>G</b> S <b>T</b> K <b>F</b> E <b>F</b> H <b>K</b> E <b>H</b> F					