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

Kerstin Müller[1*], Ada Linkies[2*], Gerhard Leubner-Metzger[2,3], and Allison R. Kermode[1,4]

[1]Simon Fraser University, Department of Biological Sciences, 8888 University Drive, Burnaby BC V5A 1S6, Canada

[2]Albert-Ludwigs-University, Institute for Biology II, Faculty of Biology, University of Freiburg, Schänzlestr. 1, 79104, Freiburg, Germany

[3]Royal Holloway, University of London, School of Biological Sciences, Egham, Surrey, TW20, 0ZX, UK

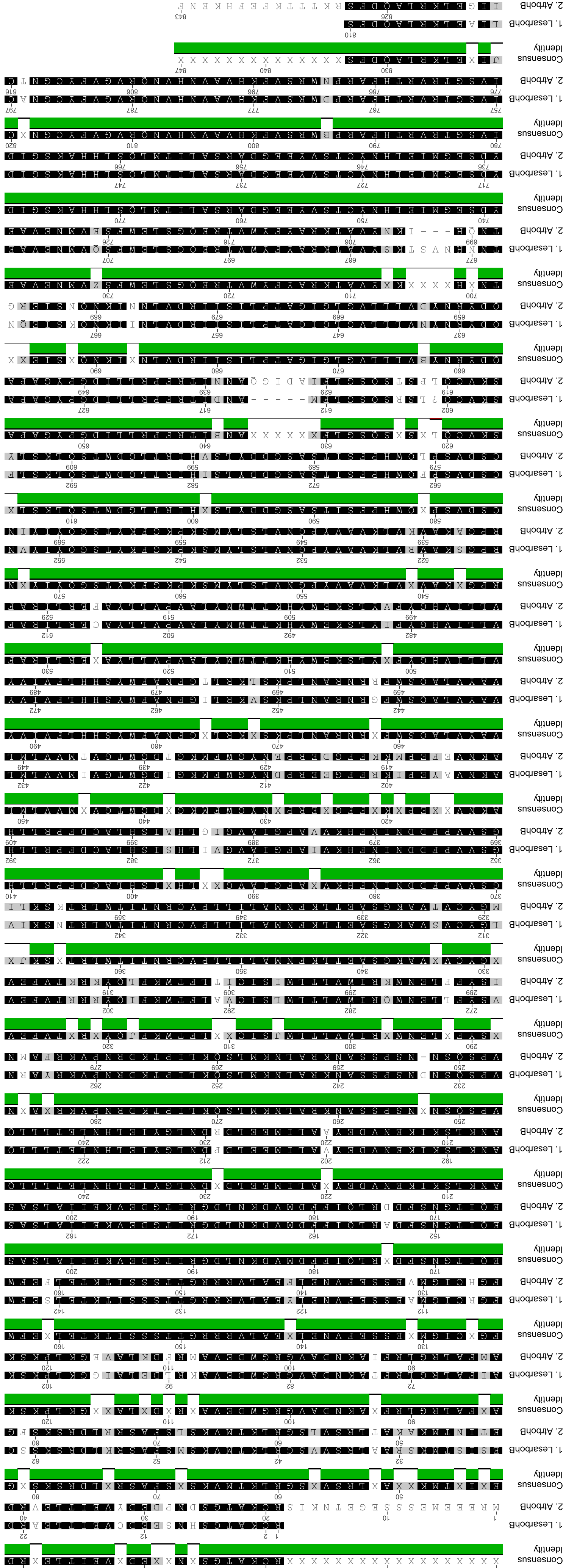
*Authors contributed equally to this work

[4]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. Leaxbohb
2. Atxbohb

```
Consensus      MXPFSKXDRRRWSFDSVSAXXXAXGSASTSPGTEYSXXGXXZEFVEVTIDLQDDDTI
Identity
1. AtrbohF     MKPFSKNDRRRWSFDSVSAGKTAVGSASTSPGTEYSING-DQEFVEVTIDLQDDDTI
2. LesarbohF   MRPFSKHDRRRWSFDSVSAERNAIGSASTSPGTEYSNGGYGEEFVEVTIDLQDDDTI

Consensus      VLRSVEPATAINVXXDISDXXXXXXXXGXMTPVSISRSPTMKRTSSNRXRQFSQELK
Identity
1. AtrbohF     VLRSVEPATAINVIGDISDDNT-----GIMTPVSISRSPTMKRTSSNRFRQFSQELK
2. LesarbohF   VLRSVEPATAINV--DISDETASTAGGGMMTPVSISRSPTMKRTSSNRLRQFSQELK

Consensus      AEAVAKAKQLSQELKRFSWSRSFSGXLTTTXXXXXQXGGXXGGLVNSALEARALRKQ
Identity
1. AtrbohF     AEAVAKAKQLSQELKRFSWSRSFSGNLTTTSTAANQSGGAGGGLVNSALEARALRKQ
2. LesarbohF   AEAVAKAKQLSQELKRFSWSRSFSGTLTTTN---HQNGG--GGLVNSALEARALRKQ

Consensus      RAQLDRTRSSAQRALRGLRFISNKXXNXDGWNDVQSNFEKXXKNGYIYRSDFAQCIG
Identity
1. AtrbohF     RAQLDRTRSSAQRALRGLRFISNKQKNVDGWNDVQSNFEKFEKNGYIYRSDFAQCIG
2. LesarbohF   RAQLDRTRSSAQRALRGLRFISNKRTNFDGWNDVQSNFEKLSKNGYIYRSDFAQCIG

Consensus      MKDSXEFALELFDALSRRRRXXVEKINHDELYEYWSQINDESFDSRLQIFFDIVDKN
Identity
1. AtrbohF     MKDSKEFALELFDALSRRRRLKVEKINHDELYEYWSQINDESFDSRLQIFFDIVDKN
2. LesarbohF   MKDSNEFALELFDALSRRRRQRVEKINHDELYEYWSQINDESFDSRLQIFFDIVDKN

Consensus      EDGRITEEEVXEIIMLSASANKLSRLKXQAEEYAALIMEELDPERLGYIELWQLETL
Identity
1. AtrbohF     EDGRITEEEVKEIIMLSASANKLSRLKEQAEEYAALIMEELDPERLGYIELWQLETL
2. LesarbohF   EDGRITEEEVQEIIMLSASANKLSRLKDQAEEYAALIMEELDPERLGYIELWQLETL

Consensus      LLQKDTYLNYSQALSYTSQALSQNLXGLRXXSRIHRMSSDXVYXXQENWKRIWVLXL
Identity
1. AtrbohF     LLQKDTYLNYSQALSYTSQALSQNLQGLRGKSRIHRMSSDFVYIMQENWKRIWVLSL
2. LesarbohF   LLQKDTYLNYSQALSYTSQALSQNLHGLRQNSRIHRMSSDCVYFIQENWKRIWVLFL

Consensus      WXMIMJGLFLWKFFQYKQKDAFHVMGYCLLTAKGAAETLKFNMALILFPVCRNTITW
Identity
1. AtrbohF     WIMIMIGLFLWKFFQYKQKDAFHVMGYCLLTAKGAAETLKFNMALILFPVCRNTITW
2. LesarbohF   WVMIMLGLFLWKFFQYKQKDAFHVMGYCLLTAKGAAETLKFNMALILFPVCRNTITW

Consensus      LRSTRLSYFVPFDDNINFHKTIAGAIVVXVILHXGDHJACDFPRIVRATEYDYNRYL
Identity
1. AtrbohF     LRSTRLSYFVPFDDNINFHKTIAGAIVVAVILHIGDHLACDFPRIVRATEYDYNRYL
2. LesarbohF   LRSTRLSYFVPFDDNINFHKTIAGAIVVGVILHVGDHIACDFPRIVRATEYDYNRYL

Consensus      FHYFQTKQPTYXDLVKGPEGITGILMVILMXISFXLATRWFRRNLVKLPXPFDRLTG
Identity
1. AtrbohF     FHYFQTKQPTYFDLVKGPEGITGILMVILMIISFTLATRWFRRNLVKLPKPFDRLTG
2. LesarbohF   FHYFQTKQPTYWDLVKGPEGITGILMVILMTISFILATRWFRRNLVKLPRPFDRLTG

Consensus      FNAFWYSHHLFXIVYXLLILHGJFLYFAKPWYVXTTWMYLAVPVLLYGGERTLRYFR
Identity
1. AtrbohF     FNAFWYSHHLFVIVYILLILHGIFLYFAKPWYVRTTWMYLAVPVLLYGGERTLRYFR
2. LesarbohF   FNAFWYSHHLFIIVYVLLILHGLFLYFAKPWYVHTTWMYLAVPVLLYGGERTLRYFR

Consensus      SGSYSVRLLKVAIYPGNVLTLQMSKPXQFRYKSGQYMFVQCPAVSPFEWHPFSITSA
Identity
1. AtrbohF     SGSYSVRLLKVAIYPGNVLTLQMSKPTQFRYKSGQYMFVQCPAVSPFEWHPFSITSA
2. LesarbohF   SGSYSVRLLKVAIYPGNVLTLQMSKPSQFRYKSGQYMFVQCPAVSPFEWHPFSITSA

Consensus      PEDBYISIHIRZLGDWTQELKXXFSEVCZPPVXGKSGLLRADEXTKXSLPKLLIDGP
Identity
1. AtrbohF     PEDDYISIHIRQLGDWTQELKRVFSEVCEPPVGGKSGLLRADETTKKSLPKLLIDGP
2. LesarbohF   PEDNYISIHIRELGDWTQELKKKFSEVCQPPVAGKSGLLRADESTKTSLPKLLIDGP

Consensus      YGAPAQDYXKYDVLLLVGLGIGATPFISILKDLLNNIVKMEEHADSISDFSRSSEXS
Identity
1. AtrbohF     YGAPAQDYRKYDVLLLVGLGIGATPFISILKDLLNNIVKMEEHADSISDFSRSSEYS
2. LesarbohF   YGAPAQDYMKYDVLLLVGLGIGATPFISILKDLLNNIVKMEEHADSISDFSRSSEHS

Consensus      TGSNXXTPRRKXILKTTNAYFYWVTREQGSFDWFKGVMNEVAELDQRGVIEMHNYLT
Identity
1. AtrbohF     TGSNGDTPRRKRILKTTNAYFYWVTREQGSFDWFKGVMNEVAELDQRGVIEMHNYLT
2. LesarbohF   TGSNSETPRRKKILKTTNAYFYWVTREQGSFDWFKGVMNEVAELDQRGVIEMHNYLT

Consensus      SVYEEGDARSALITMVQALNHAKNGVDIVSGTRVRTHFARPNWKKVLXKLSSKHXNA
Identity
1. AtrbohF     SVYEEGDARSALITMVQALNHAKNGVDIVSGTRVRTHFARPNWKKVLTKLSSKHCNA
2. LesarbohF   SVYEEGDARSALITMVQALNHAKNGVDIVSGTRVRTHFARPNWKKVLSKLSSKHTNA

Consensus      RIGVFYCGVPVLGKELSKLCNTFNQKGSTKFEFHKEHF
Identity
1. AtrbohF     RIGVFYCGVPVLGKELSKLCNTFNQKGSTKFEFHKEHF
2. LesarbohF   RIGVFYCGVPVLGKELSKLCNTFNQKGSTKFEFHKEHF
```