

## Supplemental Tables

Supplemental Table 1. Variety of mushroom species that were found to have beneficial effects in neuronal diseases

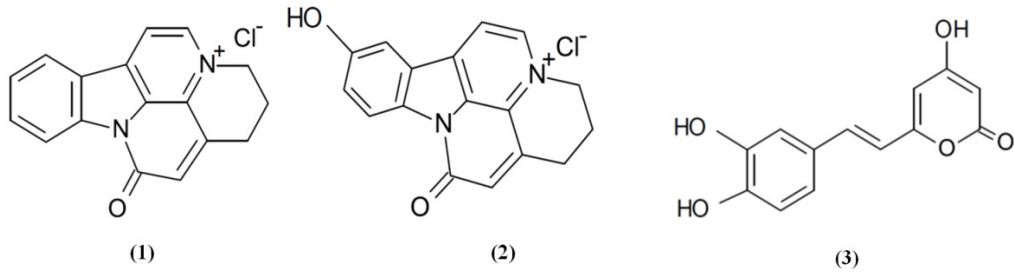
Mushroom	Common name	Taxonomy			Description	Bioactivity	References
		Class	Order	Family			
<i>Hericium erinaceus</i> (Bull.: Fr.) Pers.	Lion's mane, monkey's head, hedgehog mushroom, satyr's beard, pom pom, bearded tooth, and Yamabushitake	Agaricomycetes	Russulales	Hericiaceae	Large, white to creamy, irregular fruiting body with icicle-like projections.	Neurite outgrowth activity; Inhibition of $\beta$ - amyloid; Neuroprotection	Mori <i>et al.</i> (2011) Mori <i>et al.</i> (2009) Wong <i>et al.</i> (2007) Kawagishi and Zhuang' (2008)
<i>Ganoderma lucidum</i> (Fr) P. Karst	Lingzhi, reishi	Agaricomycetes	Polyporales	Ganodermataceae	Corky, flat, red- varnished, kidney- shaped cap	Neurite outgrowth activity; Inhibition of $\beta$ - amyloid; Neuroprotection ;	Lai <i>et al.</i> (2008) Cheung <i>et al.</i> (2000) Chen <i>et al.</i> (2007)
<i>Lignosus rhinocerus</i> (Cooke) Ryvarden	Tiger's milk mushroom	Agaricomycetes	Polyporales	Polyporaceae	Posses underground tuber-like sclerotium, solitary fruiting body	Neurite outgrowth activity	Eik <i>et al.</i> (2012)
<i>Grifola frondosa</i> (Dicks.: Fr.) S.F. Gray	Hen of the woods, dancing mushroom, Maitake	Agaricomycetes	Polyporales	Fomitopsidaceae	Manifold curled or spoon-shaped, grayish-brown caps, has tuber-like sclerotium	Neurite outgrowth activity	Nishina <i>et al.</i> (2006)
<i>Mycoleptodonoides aitchisonii</i> (Berk.) Maas Geest.	Breech oyster mushroom	Agaricomycetes	Polyporales	Mycoleptodonoides	Edible mushroom mainly found in the Kashmir region in India and in Japan. White to yellow cap with a smooth surface, and short stem. Savoury taste.	Neurite outgrowth activity; Neuroprotection	Okuyama <i>et al.</i> (2004a, 2004b) Okuyama <i>et al.</i> (2012) Kokubo <i>et al.</i> (2011) Choi <i>et al.</i> (2009)
<i>Antrodia camphorata</i> (M. Zang & C.H. Su) Sheng H. Wu, Ryvarden & T.T. Chang	Niuchangchih	Agaricomycetes	Polyporales	Fomitopsidaceae	A unique Taiwan mushroom, grows only on the inner cavity of the endemic tree species, <i>Cinnamomum</i>	Inhibition of $\beta$ - amyloid; Neuroprotection	Lu <i>et al.</i> (2006) Wang <i>et al.</i> (2012)

<i>Cordyceps militaris</i> (L.:Fr.) Link	Caterpillar fungi, Dongchongxiacao, winter worm summer grass	Sordariomycetes	Hypocreales	Clavicipitaceae	<i>kanehirai</i> Parasitic to larvae and pupae of moths and butterflies, club-sized fruiting body	Neurite outgrowth activity	Lee <i>et al.</i> (2011)
<i>Phellinus linteus</i> (Berk. & M.A. Curtis) Teng	Songgen (Chinese), meshimakobu (Japanese), Sang Hwang (Korean)	Agaricomycetes	Hymenochaetales	Hymenochaetaceae	Grows on mulberry trees, brown to yellow cap	Inhibition of BACE1	Dai <i>et al.</i> (2010) Park <i>et al.</i> (2004a, 2004b) Sheean <i>et al.</i> (2012)
<i>Inonotus obliquus</i> (Ach. ex Pers.) Pilát	Chaga mushroom	Agaricomycetes	Hymenochaetales	Hymenochaetaceae	Parasitic on birch tree, melanin-rich, black	Neuroprotection	Jung <i>et al.</i> (2008) Kim (2011) Giridharan <i>et al.</i> (2011) Nakajima <i>et al.</i> (2009) Chen <i>et al.</i> (2010)
<i>Sarcodon cyrneus</i> Maas Geest.	Bitter tooth	Agaricomycetes	Thelephorales	Bankeraceae	Distinctly bitter flavour; " <i>cyrneus</i> " for its Mediterranean habitat	Neurite outgrowth activity	Marcotullio <i>et al.</i> (2007) Obara <i>et al.</i> (2007) Marcotullio <i>et al.</i> (2006)
<i>Sarcodon scabrosus</i> (Fr.) P. Karst	Bitter tooth	Agaricomycetes	Thelephorales	Bankeraceae	Brown cap with scales, bitter taste	Neurite outgrowth activity	Ohta <i>et al.</i> (1998) Kita <i>et al.</i> (1998); Waters <i>et al.</i> (2005) Obara <i>et al.</i> (2001) Shi <i>et al.</i> (2011) Obara <i>et al.</i> (1999)
<i>Leccinum extremorientale</i> (Lar. N. Vassiljeva) Singer	Far-eastern Scaber stalk	Agaricomycetes	Boletales	Boletaceae	Red brown areolate cap	Neuroprotection	Choi <i>et al.</i> (2011)
<i>Pleurotus giganteus</i> (Berk.) Karunarathna & K.D. Hyde	Zhudugu, cow's stomach mushroom, morning glory mushroom	Agaricomycetes	Agaricales	Agaricales	Large, thick, and convex cap	Neurite outgrowth activity	Phan <i>et al.</i> (2012)
<i>Tremella fuciformis</i> Berk	Yin er, white jelly fungus, silver Ear mushroom, snow mushroom	Tremellomycetes	Tremellales	Tremellaceae	White, frond-like, gelatinous fruiting body	Neurite outgrowth activity	Kim <i>et al.</i> (2007) Park <i>et al.</i> (2012)

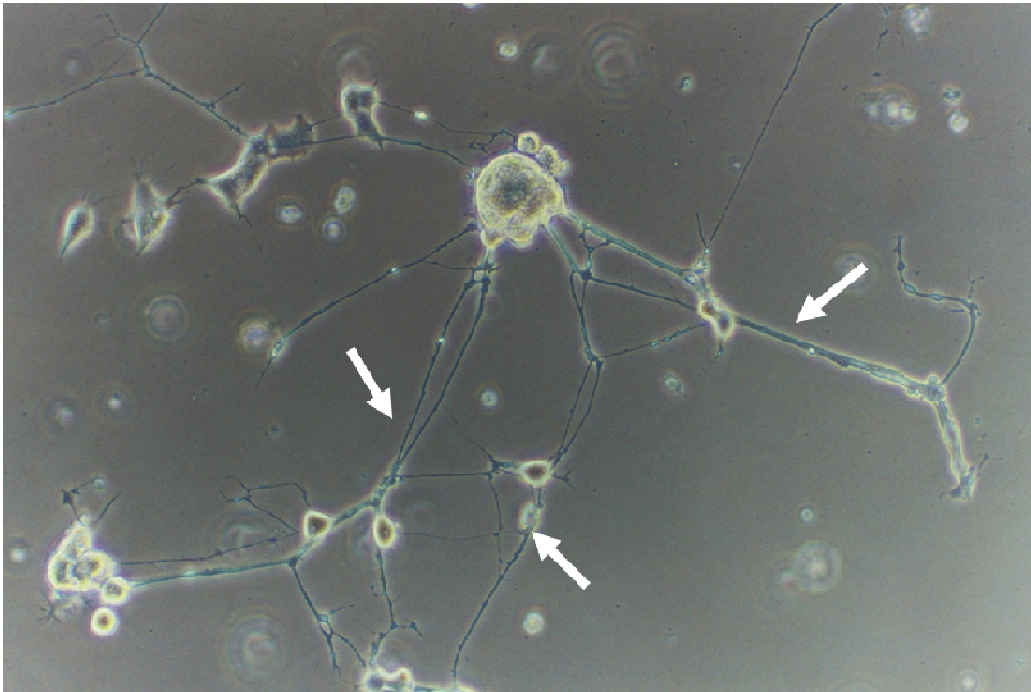
<i>Stropharia rugosoannulata</i> Farlow	Wine cap, burgundy cap, wine cap stropharia	Agaricomycetes	Agaricales	Strophariaceae	Red, brown to tan cap; bell-shaped when young but flat when old	Neuroprotection	Wu <i>et al.</i> (2011) Wu <i>et al.</i> (2012)
<i>Armillaria mellea</i> (Vahl) P. Kumm.	Honey mushroom	Agaricomycetes	Agaricales	Physalacriaceae	Pathogenic to plant, fruiting bodies found in clumps, sticky, yellow to brown cap	Neuroprotection	Watanabe <i>et al.</i> (1990) Gao <i>et al.</i> (2009) Muszyńska <i>et al.</i> (2011)
<i>Cortinarius infractus</i> (Pers.) Fr.	Bitter webcap	Agaricomycetes	Agaricales	Cortinariaceae	Greyish brown cap, bitter taste	Inhibition of AChE activity	Brondz <i>et al.</i> (2007) Geissler <i>et al.</i> (2010)
<i>Dictyophora indusiata</i> (Vent.) Desv.	“Queen of the mushrooms”, bamboo mushroom, Kinugasatake (Japanese)	Agaricomycetes	Phallales	Phallaceae	Also called <i>Phallus indusiata</i> , conical to bell-shaped cap covered with a greenish-brown spore and slime	Neurite outgrowth activity	Kawagishi <i>et al.</i> (1997)
<i>Daldinia concentrica</i> (Bolton) Ces. & De Not.	King Alfred's cake, cramp balls, coal fungus	Sordariomycetes	Xylariales	Xylariaceae	Ball-shaped, coal-black fruiting body	Neuroprotection	Quang <i>et al.</i> (2002)
<i>Tricholoma</i> sp. (Fr.) Staude	Matsutake (Japanese)	Agaricomycetes	Agaricales	Tricholomataceae	Mycorrhizal, gilled cap, fleshy stems	Neurite outgrowth activity; Inhibition of AChE activity	Tel <i>et al.</i> (2011) Tsukamoto <i>et al.</i> (2003)
<i>Termitomyces albuminosus</i> (Berk.) R. Heim	Jizong (Chinese)	Agaricomycetes	Agaricales	Lyophyllaceae	Long stem, edible. Emerge from termite nest.	Neurite outgrowth activity	Shi <i>et al.</i> (2012)
<i>Termitomyces titanicus</i> Pegler & Pearce	-	Agaricomycetes	Agaricales	Lyophyllaceae	Cap diameter of up to 1m; the largest edible mushroom in the world according to Guinness Book of Records.	Neuroprotection	Choi <i>et al.</i> (2010)

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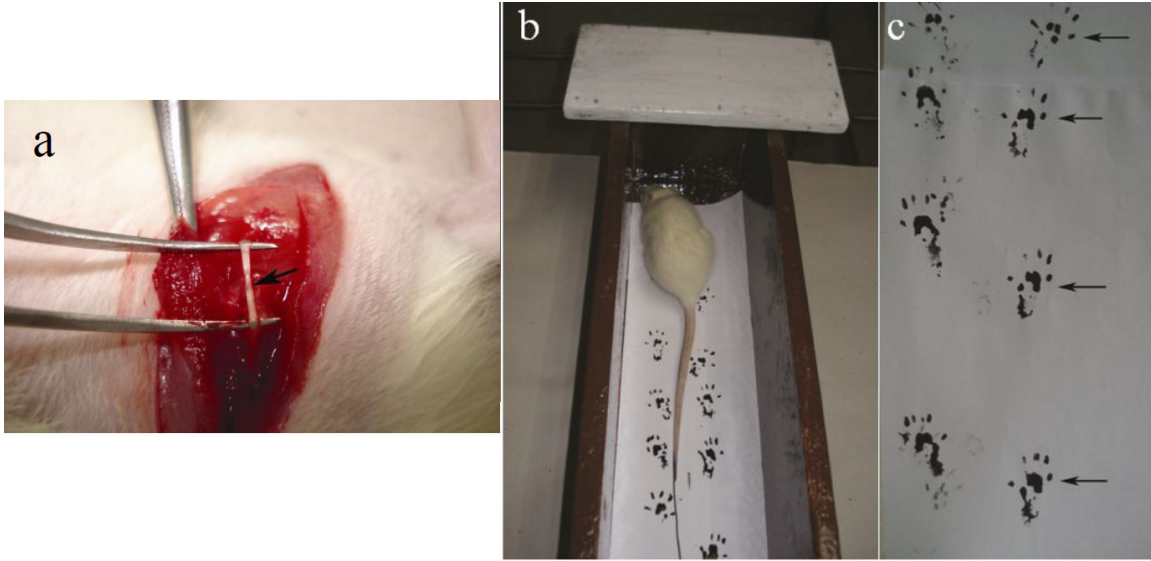
## Supplemental Figures



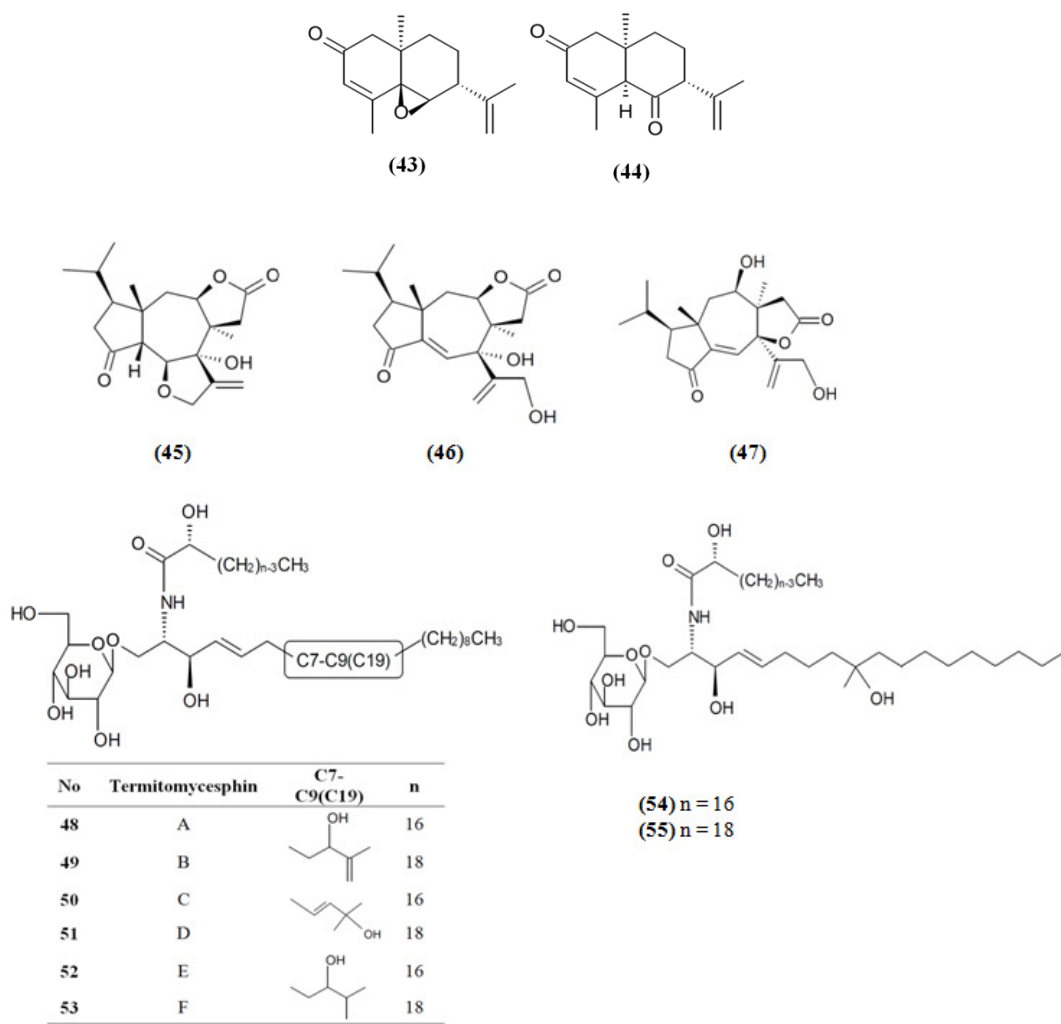
Supplemental Figure 1. Infracopicrin **(1)** and 10-hydroxy-infracopicrin **(2)** isolated from *Cortinarius infractus*; and Hispidin **(3)** from *Phellinus linteus*.



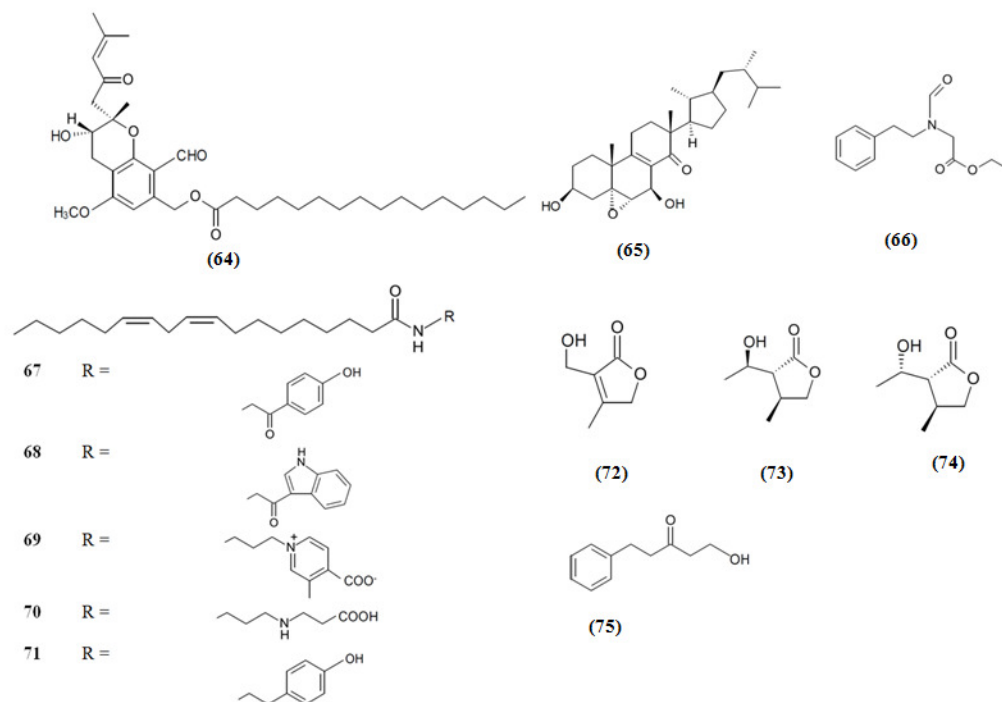
Supplemental Figure 2. Neurite formation of NG108-15 cells induced by aqueous extracts of *H. erinaceus* fruiting body. Arrows indicate neurite extension.



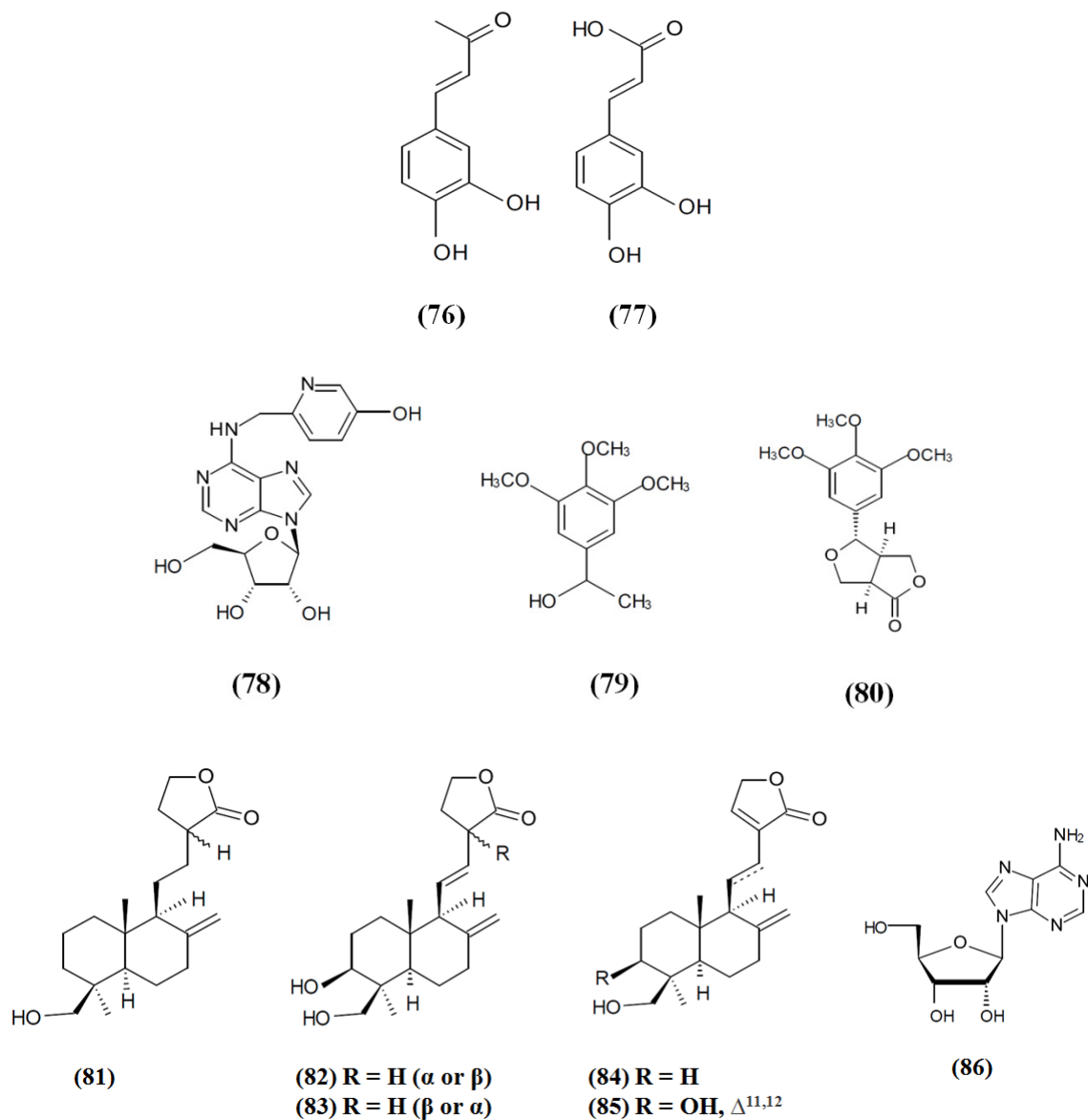
Supplemental Figure 3. (a) A complete crush of peroneal nerve is confirmed by presence of a translucent band (as indicated by an arrow) across the nerve. (b) Walking track apparatus. (c) Walking tracks of footprints after 4 days of peroneal nerve crush injury. Arrows indicate footprints of the operated limb. Foot prints in *H. erinaceus* aqueous extract group demonstrated toe-spreading and clear footprints of the operated limbs on the walking tracks.



Supplemental Figure 4. Dictyophorines A (43) and B (44), isolated from *Dictyophora indusiata*. Tricholomalides A-C (45-47) isolated from *Tricholoma* sp.; and Termitomycesphin A-H (48-55) isolated from *Termitomyces albuminosus*.



Supplemental Figure 5. 3-hydroxyhericenone F (**64**) isolated from *Hericium erinaceum*; strophasterol (**65**) from *Stropharia rugosoannulata*; Leccinine A (**66**) from *Leccinum extremiorientale*; termitomycamides A – E (**67-71**) from *Termitomyces titanicus*; and compounds **72-75** from *Mycoleptodonoides aitchisonii*.



Supplemental Figure 6. 3,4-dihydroxybenzalacetone (**76**) and caffeic acid (**77**) from *Inonotus obliquus*. N6-(5-hydroxy-2-pyridyl)-methyl-adenosine (**78**) from the mycelia of *A. mellea*; 1-(3,4,5-trimethoxyphenyl) ethanol (**79**) and caruilignan C (**80**) from *Daldinia concentrica*. Neuroprotective diterpenes (**81-85**) and adenosine (**86**) from *Antrodia camphorate*.