

Species Diversity and Utilization of Medicinal Mushrooms and Fungi in China (Review)

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ABSTRACT: The investigation and utilization of medicinal fungi in China has received considerable attention in recent years. However, information on medicinal fungi is scattered throughout the literature, and many nomenclatural inconsistencies have been found in the Chinese reports. The publications on Chinese medicinal fungi have been critically checked; as a result, 540 medicinal mushrooms and fungi from China were enumerated in the present checklist. All names have been checked or revised in accordance with contemporary taxonomy and the latest version of the International Code of Botanical Nomenclature (Vienna Code). The “out-of-date” names, illegitimate names, nonexistent names, and misapplied names in previous reports were revised. The common synonyms are listed after their valid names. The main medicinal functions of each species, together with the original or important references, are provided. The 540 species belonging to 10 classes, 26 orders, 76 families, and 199 genera of Ascomycota and Basidiomycota have been recorded with medicinal values. Most are the higher Basidiomycetes (482 species), which comprise approximately 89% of all the Chinese medicinal species. In total, 126 medicinal functions are thought to be provided by Chinese medicinal fungi, and 331 (61% of the total medicinal fungi) can be used as antitumor agents. Other common functions are hemostasis, antibacterial, improving immunity, detoxication, and anti-inflammatory. Fifteen species, including *Ganoderma lucidum*, are the most important or commonly used medicinal fungi, and 26 species, including *Agaricus bisporus*, are commonly cultivated in China as food or for medicinal products.

KEY WORDS: medicinal mushrooms and fungi species diversity, hemostasis, antibacterial, immunomodulating, anti-inflammatory, antitumor activity, detoxication, hepatoprotective, cholesterol-lowering activity, antidiabetic, China

I. INTRODUCTION

Medicinal mushrooms and fungi are some of the important resources of Chinese medicine. Medicinal mushrooms and fungi were used as medicine by Chinese ancestors long ago. Some species have been used as Chinese medicine for more than 2000 years, for example, *Auricularia auricula* (wood ear), *Ganoderma* sp. (Ling Zhi), *Mylitta lapidescens* (Leiwan),

Wolfiporia cocos (China root), and *Polyporus umbellatus* (Zhuling) were recorded in “Shen Nong Materia Medica,” which was published around 102–200 AD.¹ A more comprehensive Chinese medicinal book, “Compendium Materia Medica,” was written by the famous Chinese doctor Li,² and many species of mushrooms and fungi were included as medicine in this book. However, systematic studies on Chinese medicinal mushrooms and fungi just

began during the 1980s. Liu³ wrote the first book on Chinese medicinal fungi, which included 121 species, and Ying et al.⁴ produced illustrations on 272 Chinese medicinal mushrooms and fungi. Mao^{5,6} mentioned 387 and 406 fungi, respectively, which have medicinal functions. Additionally, more than 200 species mentioned as medicinal mushrooms and fungi have been recorded in many kinds of literatures, and recently, Dai and Yang⁷ made a list of Chinese medicinal fungi, including 473 species. However, almost all these publications dealing with medicinal fungi were in Chinese, and most of them are unknown outside China. We feel, therefore, that it is necessary to compile a list of Chinese medicinal mushrooms and fungi in English.

The investigation and utilization of medicinal mushrooms and fungi in China and many other countries are getting more attention in recent years; for example, many papers involved in medicinal resources, medicinal values, and the chemistry of fungi have been published, but several nomenclatural inconsistencies were found in these reports, for example, "out-of-date" names, illegitimate names, nonexistent names, and misapplied names appeared frequently in these publications. The publications on Chinese medicinal mushrooms and fungi were critically checked. As a result, 540 species have been recorded with medicinal values. All of the names were checked or revised in accordance with contemporary taxonomy and the latest version of the International Code of Botanical Nomenclature (Vienna Code). The taxonomic system mostly follows the latest version (10th) of the Dictionary of the Fungi.⁸ However, some cases, for example, *Fomitiporia*, which is a distinct genus separate from *Phellinus*, are treated independently in the present list.

In addition, the species of *Amanita*, *Lactarius*, *Ramaria*, *Russula*, and Polyporaceae s. l. were revised according to our own studies of materials collected from various parts of China. Around 60 species in these groups were mentioned as medicinal mushrooms, but based on our study, some don't exist in China and, hence, are excluded from the present list. In fact, more than 40 names represent other species, and these names were treated as synonyms after the valid names.

The medicinal functions or therapeutic properties of each species are based on Chinese references,

and they are listed after each name. The main functions are provided if species have multiple functions. The present article is dedicated to Chinese medicinal fungi, and the cited references are dedicated to Chinese therapeutic data, although more therapeutic properties for some important species have been found, according to recent studies.⁹⁻¹² Concerning the cited Chinese references, most of these have been published during the last 20 years, but a few important books, for example, "The Chinese Medicinal Fungi"³ and "Icons of Medicinal Fungi from China,"⁴ are included in the references.

II. RESULTS

Below is a critical alphabetical list of all known medicinal mushrooms and fungi of China with indications of their therapeutic effects according to the practice of Traditional Chinese Medicine, as well as in Chinese scientific publications up until 2009.

1. *Abortiporus biennis* (Bull.) Singer [= *Daedalea biennis* (Bull.) Fr.]: antitumor^{4,13}
2. *Agaricus arvensis* Schaeff.: treating lumbago and skelalgia, limb numbness³
3. *Agaricus bisporus* (J.E. Lange) Imbach: promoting digestion, lowering blood pressure, antibacterial, antitumor¹³
4. *Agaricus brasiliensis* Wasser et al. [= *A. blazei* Murrill sensu Heinem.]: lowering blood pressure, antitumor^{14,15}
5. *Agaricus campestris* L.: treating anemia, dermatophytosis and hypopepsia, antibacterial, antitumor^{4,13}
6. *Agaricus dulcidulus* Schulzer [= *Agaricus rubellus* (Gillet) Sacc.]: antitumor, promoting digestion¹⁶
7. *Agaricus micromegethus* Peck: antitumor, promoting digestion^{13,16}
8. *Agaricus placomyces* Peck: antitumor^{4,13}
9. *Agaricus subrufescens* Peck: antitumor^{6,13}
10. *Agaricus subrutilescens* (Kauffman) Hotsón et D.E. Stuntz: antitumor^{4,13}
11. *Agrocybe cylindracea* (DC.) Gillet [= *A. aegerita* (V. Brig.) Singer]: inducing diuresis, invigorating the spleen, improving immunity, antitumor, antidiarrheal, antifungal^{4,6,15,17}
12. *Agrocybe dura* (Bolton) Singer: antibacterial, antifungal⁴

13. *Agrocybe erebia* (Fr.) Kühner ex Singer: antitumor⁶
14. *Agrocybe paludosa* (J.E. Lange) Kühner et Romagn.: antitumor⁴
15. *Agrocybe pediades* (Fr.) Fayod: antitumor⁶
16. *Agrocybe praecox* (Pers.) Fayod: antitumor⁴
17. *Albatrellus confluens* (Alb. et Schwein.) Kotl. et Pouzar: lowering cholesterol¹⁶
18. *Albatrellus ovinus* (Schaeff.) Kotl. et Pouzar: reducing effects of Alzheimer's Disease¹⁶
19. *Aleurodiscus amorphus* Rabenh.: antitumor⁶
20. *Aleurodiscus mirabilis* (Berk. et M.A. Curtis) Höhn.: antibacterial¹⁸
21. *Amanita avellaneosquamosa* (S. Imai) S. Imai: treating lumbago and skelalgia, limb numbness (under the name of *A. agglutinata* (Berk. et M.A. Curtis) Lloyd and *Amanitopsis volvata* (Peck) Sacc.)^{3,19}
22. *Amanita griseofolia* Zhu L. Yang: antieczemetic (under the name of *A. inaurata* Secr. ex Gillet)⁴
23. *Amanita hemibapha* (Berk. et Broome) Sacc.: antitumor (under the name of "*A. caesarea* (Scop.) Pers.")^{4,13}
24. *Amanita manginiana* sensu W.F. Chiu: antitumor (under the name of *A. phalloides* (Fr.) Link)⁴
25. *Amanita muscaria* (L.) Lam.: antitumor, treating insomnia⁴
26. *Amauroderma rude* (Berk.) Torrend: anti-inflammatory, eliminating blood stasis³
27. *Amauroderma rugosum* (Blume et T. Nees) Torrend: anti-inflammatory, inducing diuresis, improving the stomach function, antitumor¹⁷
28. *Ampulloclitocybe clavipes* (Pers.) Redhead et al. [= *Clitocybe clavipes* (Pers.) P. Kumm.]: antitumor⁶
29. *Antrodia albida* (Fr.) Donk: antitumor¹³
30. *Antrodia xantha* (Fr.) Ryvarden [= *Poria xantha* (Fr.) Cooke]: antibacterial, antitumor⁶
31. *Antrodiella zonata* (Berk.) Ryvarden [= *Coriolus consors* (Berk.) Imazeki; the materials of this name mentioned in the Chinese publications were examined, and they in fact represent *A. zonata*]: antibacterial, antitumor^{4,13}
32. *Armillaria borealis* Marxm. et Korhonen [= *Armillariella mellea* (Vahl) P. Karst. s.l.]; materials of this name in the Chinese reports were examined, and, according to our study, they in fact represent four species of *Armillaria*. Therefore, we treat them as *A. borealis* and the following three species]: tranquilizing, improving immunity, treating neurasthenia, insomnia, limb numbness^{3,4}
33. *Armillaria gallica* Marxm. et Romagn [= *Armillariella mellea* s.l.]: treating neurasthenia, insomnia, limb numbness²⁰⁻²²
34. *Armillaria mellea* (Vahl) P. Kumm. s. str.: improving immunity, treating insomnia, antitumor⁴
35. *Armillaria ostoyae* (Romagn.) Herink [= *Armillariella mellea* s.l.]: tranquilizing, improving immunity, treating neurasthenia, insomnia, limb numbness²³
36. *Armillaria sinapina* Bérubé et Dessur. [= *Armillariella mellea* s.l.]: tranquilizing, improving immunity, treating neurasthenia, insomnia, limb numbness²³
37. *Armillaria tabescens* (Scop.) Emel [= *Armillariella tabescens* (Scop.) Singer]: treating hepatopathy, antitumor^{3,4}
38. *Astraeus hygrometricus* (Pers.) Morgan [= *Gastrum hygrometricum* Pers.]: hemostasis, treating chilblain³
39. *Auricularia auricula-judae* (Bull.) Quéf. [= *A. auricula* (L. ex Hook.) Underw.]: antiulcer, replenishing the blood, moistening the lung, hemostasis, lowering blood glucose^{3,24,25}
40. *Auricularia delicata* (Fr.) Henn.: replenishing the blood, moistening the lung, hemostasis^{4,23}
41. *Auricularia mesenterica* (Dicks.) Pers.: antitumor⁴
42. *Auricularia polytricha* (Mont.) Sacc.: promoting blood circulation, treating hemorrhoids, analgesic, antitumor^{3,4}
43. *Bankera fuligineoalba* (J.C. Schmidt) Coker et Beers ex Pouzar [= *Sarcodon fuligineoalbus* (J.C. Schmidt) Quéf.]: anti-inflammatory, antitumor^{3,6}
44. *Battarrea phalloides* (Dicks.) Pers.: detumescence, hemostasis, clearing the lung, relieving sore throat, detoxication³
45. *Battarrea stevenii* (Libosch.) Fr.: detumescence, hemostasis, clearing the lung, relieving sore throat, detoxication³
46. *Beauveria bassiana* (Bals.-Criv.) Vuill.: antifungal, treating diabetes⁴
47. *Bjerkandera adusta* (Willd.) P. Karst.: antitumor⁶
48. *Bjerkandera fumosa* (Pers.) P. Karst.: antitumor³
49. *Boletinus cavipes* (Klotzsch) Kalchbr.: treating lumbago and skelalgia, deadlimb³
50. *Boletopsis leucomelaena* (Pers.) Fayod: treating asthma, rheumatism, psoriasis²¹
51. *Boletus aereus* Bull.: invigorating spleen and resolving food stagnation, invigorating the kidney¹⁶
52. *Boletus appendiculatus* Schaeff.: treating lumbago and skelalgia, limb numbness²⁶

53. *Boletus brunneissimus* W.F. Chiu: relieving fever¹⁶
54. *Boletus edulis* Bull.: treating lumbago and skelalgia, deadlimb, antitumor^{27,28}
55. *Boletus erythropus* Pers.: antitumor⁴
56. *Boletus impolitus* Fr.: treating limb numbness, antitumor²⁹
57. *Boletus pulverulentus* Opat.: antitumor⁴
58. *Boletus regius* Krombh.: antitumor⁴
59. *Boletus rubellus* Krombh.: antitumor⁴
60. *Boletus satanas* Lenz: antitumor⁴
61. *Boletus speciosus* Frost: promoting digestion, antitumor^{3,30}
62. *Boletus violaceofuscus* W.F. Chiu: antitumor⁴
63. *Bondarzewia berkeleyi* (Fr.) Bondartsev et Singer: detoxication¹⁴
64. *Bondarzewia montana* (Quél.) Singer: detoxication⁴
65. *Bovista nigrescens* Pers.: hemostasis¹⁴
66. *Bovista plumbea* Pers.: hemostasis, detumescence, detoxication³
67. *Bovista pusilla* (Batsch) Pers. [= *Lycoperdon pusillum* Batsch]: detumescence, hemostasis, detoxification, clearing the lung, relieving sore throat³
68. *Bovistella radicata* (Durieu et Mont.) Pat.: hemostasis, detumescence³
69. *Bovistella sinensis* Lloyd: hemostasis, detumescence, disinfecting, clearing the lung³
70. *Bulgaria inquinans* (Pers.) Fr.: reducing blood viscosity, antitumor^{31,32}
71. *Calocybe gambosa* (Fr.) Donk [= *Tricholoma gambosum* (Fr.) Gillet]: invigorating qi, thermolysis³
72. *Calostoma japonica* Henn.: antitumor⁴
73. *Calvatia candida* (Rostk.) Hollós: relieving fever, hemostasis⁴
74. *Calvatia craniiformis* (Schwein.) Fr.: anti-inflammatory, detumescence, analgesic³
75. *Calvatia cyathiformis* (Bosc) Morgan: detumescence, hemostasis, detoxication⁶
76. *Calvatia gigantea* (Batsch) Lloyd: antitumor, detumescence, analgesic, clearing the lung, detoxification, treating dermatomycosis^{3,20}
77. *Calvatia lilacina* (Berk. et Mont.) Lloyd: hemostasis, detumescence, detoxication³
78. *Calvatia tatrensis* Hollós: hemostasis, anti-inflammatory⁶
79. *Cantharellula umbonata* (J.F. Gmel.) Singer: antitumor⁶
80. *Cantharellus cibarius* Fr.: improving eyesight, promoting digestion, treating respiratory and gastrointestinal tract infections, antitumor³³
81. *Cantharellus minor* Peck: improving eyesight, improving the lung, invigorating the stomach^{4,13}
82. *Cantharellus tubaeformis* Fr.: antibacterial⁴
83. *Castanoporus castaneus* (Lloyd) Ryvar den: antitumor⁶
84. *Cerrena unicolor* (Bull.) Murrill: treating chronic bronchitis, antitumor^{3,4}
85. *Chlorophyllum agaricoides* (Czern.) Vellinga [= *Secotium agaricoides* (Czern.) Hollós]: detumescence, hemostasis, clearing the lung, relieving sore throat, detoxication³
86. *Chroogomphus rutilus* (Schaeff.) O.K. Miller: treating neurodermatitis⁶
87. *Clavaria zollingeri* Lév.: antitumor⁴
88. *Claviceps purpurea* (Fr.) Tul.: treating postpartum hemorrhage, migraine^{3,34}
89. *Clitocybe candicans* (Pers.) P. Kumm.: antibacterial¹⁶
90. *Clitocybe candida* Bres. [= *Leucopaxillus candidus* (Bres.) Singer]: antibacterial⁴
91. *Clitocybe eucalyptorum* Cleland: antifungal²¹
92. *Clitocybe fragrans* Sowerby: antitumor⁴
93. *Clitocybe geotropa* (Bull.) Quél.: antitumor⁴
94. *Clitocybe hydrogramma* (Bull. et A. Venturi) P. Kumm.: antibiotics²¹
95. *Clitocybe infundibuliformis* (Schaeff.) Fr.: antitumor⁴
96. *Clitocybe nebularis* (Batsch) P. Kumm.: antibacterial, antitumor^{4,35}
97. *Clitocybe odora* (Bull.) P. Kumm.: antitumor¹⁶
98. *Collybia maculata* (Alb. et Schwein.) P. Kumm.: antifungal, antiviral¹⁶
99. *Coprinus micaceus* (Bull.) Fr.: [= *Coprinellus micaceus* (Bull.) Vilgalys et al.]: antitumor⁴
100. *Coprinus radians* (Desm.) Fr. [= *Coprinellus radians* (Desm.) Vilgalys et al.]: antitumor⁴
101. *Coprinus atramentarius* (Bull.) Fr. [= *Coprinopsis atramentaria* (Bull.) Redhead et al.]: promoting digestion, eliminating phlegm, detoxification, detumescence, antitumor^{3,4}
102. *Coprinus macrorrhizus* (Pers.) Rea [= *Coprinopsis cinerea* (Schaeff.) Redhead et al.]: antitumor⁶
103. *Coprinus friesii* Quél. [= *Coprinopsis friesii* (Quél.) Redhead et al.]: antitumor⁴
104. *Coprinus insignis* Peck [= *Coprinopsis insignis* (Peck) Redhead et al.]: antitumor⁶
105. *Coprinus lagopus* (Fr.) Fr. [= *Coprinopsis lagopus* (Fr.) Redhead et al.]: antitumor⁶
106. *Coprinus comatus* (O.F. Müll.) Pers.: promoting digestion, treating hemorrhoids and diabetes, antitumor, antifungal^{3,36,37}
107. *Coprinus sterquilinus* (Fr.) Fr.: promoting diges-

- tion, eliminating phlegm, detoxification, detumescence, antitumor^{3,4}
108. *Cordyceps brasiliensis* Henn.: improving immunity³⁸
 109. *Cordyceps crassispora* M. Zang et al.: tranquilizing¹⁴
 110. *Cordyceps forquignonii* Quéf. [= *Cordyceps myrmecophila* Ces.]: reinforcing insufficiency, improving the lung and invigorating the kidney, treating hepatitis³⁹
 111. *Cordyceps gracilis* (Grev.) Durieu et Mont.: tranquilizing, invigorating the kidney, treating pulmonary diseases, antitumor³⁸
 112. *Cordyceps gunnii* (Berk.) Berk.: analgesic, lowering blood pressure, improving immunity⁴⁰
 113. *Cordyceps hawkesii* Gray: invigorating the kidney, hemostasis, resolving phlegm^{4,40}
 114. *Cordyceps kyusyuensis* A. Kawam.: invigorating the kidney, moistening the lung⁴¹
 115. *Cordyceps liangshanensis* M. Zang, D. Liu et R. Hu: tranquilizing, invigorating the kidney, treating pulmonary diseases, antitumor³⁸
 116. *Cordyceps martialis* Speg.: invigorating the kidney and lung⁶
 117. *Cordyceps memorabilis* (Ces.) Ces.: inhibiting the coagulation of platelets³⁸
 118. *Cordyceps militaris* (Fr.) Link: hemostasis and resolving phlegm, antitumor, antibacterial, invigorating the kidney, treating bronchitis^{34,42,43}
 119. *Cordyceps nutans* Pat.: invigorating the lung and kidney^{6,39}
 120. *Cordyceps ophioglossoides* (Ehrh.) Link: promoting blood circulation, regulating menstruation^{3,4}
 121. *Cordyceps oxycephala* Penz. et Sacc.: antitumor³⁸
 122. *Cordyceps polyarthra* Möller: reinforcing insufficiency, invigorating the lung and kidney³⁹
 123. *Cordyceps pruinosus* Petch: treating cardiovascular diseases³⁸
 124. *Cordyceps sinensis* (Berk.) Sacc.: tranquilizing, invigorating the kidney, treating pulmonary diseases, antitumor^{3,4,34}
 125. *Cordyceps sobolifera* (Hill ex Watson) Berk. et Broome: relieving fever, detoxification, treating diabetes^{3,39}
 126. *Cordyceps sphaecocephala* (Klotzsch ex Berk.) Berk. et M.A. Curtis: reinforcing insufficiency, improving the lung and invigorating the kidney, hemostasis, resolving phlegm³⁹
 127. *Cordyceps taii* Z.Q. Liang et A.Y. Liu: antitumor³⁸
 128. *Cordyceps takaomontana* Yakush. et Kumaz.: antitumor and improving immunity³⁸
 129. *Cortinarius bovinus* Fr.: antitumor⁴
 130. *Cortinarius cinnamomeus* (L.) Fr.: antitumor⁴
 131. *Cortinarius collinitus* (Pers.) Fr.: antitumor⁴
 132. *Cortinarius glutinosus* Peck: antitumor¹⁴
 133. *Cortinarius hemitrichus* (Pers.) Fr.: antitumor⁴
 134. *Cortinarius latus* (Pers.) Fr.: antitumor⁴
 135. *Cortinarius lividochraceus* (Berk.) Berk. [= *Cortinarius elatior* Fr.]: antitumor⁴
 136. *Cortinarius mucifluus* Fr.: antitumor⁶
 137. *Cortinarius pholideus* (Fr.) Fr.: antitumor⁶
 138. *Cortinarius salor* Fr.: antitumor⁴
 139. *Cortinarius sanguineus* (Wulfen) Fr.: antitumor⁴
 140. *Cortinarius torvus* (Fr.) Fr.: antitumor⁶
 141. *Cortinarius turmalis* Fr.: antitumor⁴
 142. *Cortinarius vibratilis* (Fr.) Fr.: antitumor⁶
 143. *Cortinarius violaceus* (L.) Gray: antitumor⁴
 144. *Cryptoporus sinensis* Sheng H. Wu et M. Zang: treating asthma and tracheitis, antibacterial, anti-inflammatory⁴⁴
 145. *Cryptoporus volvatus* (Peck) Shear: treating asthma and tracheitis, antibacterial, anti-inflammatory^{3,20}
 146. *Cyathus helenae* H.J. Brodie: antibacterial, antifungal²¹
 147. *Cyathus stercoreus* (Schwein.) De Toni: treating gastropathy³
 148. *Cyathus striatus* (Huds.) Willd.: antibacterial, treating gastropathy³
 149. *Cyclomyces tabacinus* (Mont.) Pat. [= *Inonotus tabacinus* (Mont.) G. Cunn.]: antitumor⁴
 150. *Dacrymyces palmatus* (Schwein.) Burt: antitumor⁶
 151. *Daedalea dickinsii* Yasuda [= *Trametes dickinsii* Berk. ex Cooke]: antitumor⁴
 152. *Daedaleopsis tricolor* (Bull.) Bondartsev et Singer: antitumor¹³
 153. *Daldinia concentrica* (Bolton) Ces. et De Not.: treating infantile convulsion¹⁶
 154. *Dictyophora duplicata* (Bosc) E. Fisch.: treating dysentery, improving immunity, antiaging, bacteriostasis^{4,45}
 155. *Dictyophora indusiata* (Vent.) Desv. [= *Phallus indusiatus* Vent.]: treating dysentery, lowering cholesterol, antitumor^{4,34,46}
 156. *Dictyophora multicolor* Berk. et Broome: treating dermatophytosis, improving immunity, antiaging, bacteriostasis^{3,45}
 157. *Disciseda cervina* (Berk.) Hollós: anti-inflammatory hemostasis⁶
 158. *Earliella scabrosa* (Pers.) Gilb. et Ryvarden [= *Trametes corrugata* (Pers.) Bres.]: promoting blood circulation, relieving itching⁴
 159. *Engleromyces goetzei* Henn.: anti-inflammatory and antibacterial³
 160. *Entoloma abortivum* (Berk. et M.A. Curtis)

- Donk [= *Rhodophyllus abortivum* (Berk. et M.A. Curtis) Singer]: antitumor⁴
161. *Entoloma chyeatum* (L.) P. Kumm.: antitumor⁴
162. *Entoloma sinuatum* (Bull.) P. Kumm.: antitumor^{4,13}
163. *Fistulina hepatica* (Schaeff.) With.: antitumor and treating gastrointestinal diseases^{6,13}
164. *Flammulina velutipes* (Curtis) Singer: lowering blood pressure, lowering cholesterol, antitumor^{20,47,48}
165. *Flavodon flavus* (Klotzsch) Ryvarden [= *Hirschioporus flavus* (Klotzsch) Teng]: antitumor⁴
166. *Fomes fomentarius* (L.) J.J. Kickx [= *Pyropolyporus fomentarius* (L.) Teng]: eliminating blood stasis, antitumor^{3,21,23}
167. *Fomitiporia hartigii* (Allesch. et Schnabl) Fiasson et Niemelä [= *Phellinus hartigii* (Allesch. et Schnabl) Pat.]: antitumor^{4,49}
168. *Fomitiporia punctata* (Fr.) Murrill [= *Fuscoporia punctata* (Fr.) G. Cunn.]: treating coronary artery diseases⁴
169. *Fomitiporia robusta* (P. Karst.) Fiasson et Niemelä [= *Phellinus robustus* (P. Karst.) Bourdot et Galzin]: antitumor⁶
170. *Fomitopsis officinalis* (Vill.) Bondartsev et Singer: inducing diuresis, treating gastropathy, detumescence, antitumor^{3,23}
171. *Fomitopsis pinicola* (Sw.) P. Karst.: dispelling wind-evil, eliminating dampness, antitumor^{3,23}
172. *Fomitopsis rosea* (Alb. et Schwein.) P. Karst.: antitumor⁶
173. *Ganoderma applanatum* (Pers.) Pat.: antitumor, antiviral, lowering blood glucose, improving immunity^{23,50}
174. *Ganoderma australe* (Fr.) Pat. [= "*Ganoderma tornatum* (Pers.) Bres."]: antitumor¹⁶
175. *Ganoderma boninense* Pat.: antitumor¹⁶
176. *Ganoderma capense* (Lloyd) Teng: relieving cough¹⁶
177. *Ganoderma formosanum* T.T. Chang et T. Chen: invigorating liver²¹
178. *Ganoderma lobatum* (Schwein.) G.F. Atk.: antitumor¹⁶
179. *Ganoderma lucidum* (Curtis.) P. Karst.: antitumor, lowering blood pressure, improving immunity, antithrombotic^{3,23}
180. *Ganoderma multipileum* Ding Hou: antitumor⁵¹
181. *Ganoderma resinaceum* Boud. [= "*Ganoderma sessile* Murrill"]: antitumor¹⁶
182. *Ganoderma sinense* J.D. Zhao, L.W. Hsu et X.Q. Zhang: antitumor, anti-inflammatory, inducing diuresis, invigorating the stomach³
183. *Ganoderma tenue* J.D. Zhao et al.: tranquilizing, treating hepatitis⁶
184. *Ganoderma tropicum* (Jungh.) Bres.: treating coronary artery disease⁶
185. *Ganoderma tsugae* Murrill: calming nerves and invigorating the liver, antitumor^{6,32,53}
186. *Geastrum fimbriatum* Fr.: anti-inflammatory, hemostasis, detoxication⁶
187. *Geastrum rufescens* Pers.: hemostasis⁵⁴
188. *Geastrum saccatum* Fr.: hemostasis⁵⁴
189. *Geastrum triplex* Jungh.: hemostasis, disinfecting, clearing the lung, relieving sore throat, detoxication³
190. *Geastrum velutinum* Morgan: hemostasis, detoxication¹⁴
191. *Gibberella fujikuroi* (Sawada) Wollenw.: relieving itching, treating dermatosis⁵⁵
192. *Gloeophyllum sepiarium* (Wulfen) P. Karst.: antitumor²³
193. *Gloeophyllum subferrugineum* (Berk.) Bondartsev et Singer: eliminating dampness⁴
194. *Gloeophyllum trabeum* (Pers.) Murrill: antitumor⁴
195. *Gloeostereum incarnatum* S. Ito et S. Iami: improving immunity, antibacterial, antitumor^{34,56,57}
196. *Grifola frondosa* (Dicks.) Gray [= *Polyporus frondosus* (Dicks.) Fr.]: treating hepatopathy and diabetes, antihypertensive, antitumor⁵⁸⁻⁶⁰
197. *Gymnopilus aeruginosus* (Peck) Singer: antitumor⁴
198. *Gymnopilus liquiritiae* (Pers.) P. Karst.: antitumor⁴
199. *Gymnopilus spectabilis* (Fr.) Singer: antitumor⁶¹
200. *Gymnopus confluens* (Pers.) Antonín, Halling et Noordel.: antibacterial, antifungal²¹
201. *Gyroporus castaneus* (Bull.) Quéf.: antitumor⁴
202. *Halorosellinia oceanica* (S. Schatz) Whalley et al.: antifungal²¹
203. *Hebeloma laterinum* (Batsch) Vesterh. [= *Hebeloma senescens* (Batsch) Berk. et Broome]: antibacterial²¹
204. *Hericium coralloides* (Scop.) Pers.: treating gastric ulcer and neurasthenia, promoting digestion^{3,20,23}
205. *Hericium erinaceus* (Bull.) Pers.: antitumor, antithrombotic, antiaging, lowering blood glucose and cholesterol, improving immunity^{20,62-64}
206. *Heterobasidium parviorum* Niemelä et Korhonen [= *Fomitopsis annosa* (Fr.) P. Karst.]: antibacterial⁴
207. *Hexagonia apiaria* (Pers.) Fr.: tonifying intestines, promoting digestion^{3,4}
208. *Hohenbuehelia grisea* (Peck) Singer [= *Pleurotus griseus* Peck]: antibacterial, antitumor²¹
209. *Hohenbuehelia petaloides* (Bull.) Schulzer

- [=*Hohenbuehelia geogenia* (DC.) Singer]: antitumor⁶
210. *Hydnum repandum* L.: antitumor²¹
211. *Hypholoma fasciculare* (Fr.) P. Kumm. [*Naematoloma fasciculare* (Fr.) P. Karst.]: antitumor⁴
212. *Hypholoma sublateritium* (Schaeff.) Quél. [*Naematoloma sublateritium* (Schaeff.) P. Karst.]: antitumor⁴
213. *Hypocrea peltata* (Jungh.) Sacc.: antibacterial, antifungal²¹
214. *Hypocrella bambusae* (Berk. et Broome) Sacc.: treating gastropathy, arthritis, psoriasis, vitiligo^{3,4,65}
215. *Hypomyces chrysospermus* Tul. et C. Tul.: hemostasis³
216. *Hypomyces hyalinus* (Schwein.) Tul. et C. Tul.: detoxifying mycetism⁶
217. *Hypoxyton fragiforme* (Pers.) J.J. Kickx: anti-HIV³
218. *Hypsizygus marmoreus* (Peck) H.E. Bigelow: hemagglutination inhibition⁶⁶
219. *Hypsizygus ulmarius* (Bull.) Redhead [= *Lyophyllum ulmarius* (Bull.) Kühner]: antitumor³⁵
220. *Inocutis levis* (P. Karst.) Y.C. Dai et Niemelä: antitumor, treating diabetes⁶⁷
221. *Inocutis rheades* (Pers.) Fiasson et Niemelä [= *Xanthochrous rheades* (Pers.) Pat.]: hemostasis, analgesic, treating hemorrhoids⁴
222. *Inocutis tamaricis* (Pat.) Fiasson et Niemelä: hemostasis, analgesic, treating hemorrhoids⁴
223. *Inocybe rimosa* (Bull.) P. Kumm. [= *Inocybe fastigiata* (Schaeff.) Quél.]: antitumor, antieczematic^{4,16}
224. *Inonotus cuticularis* (Bull.: Fr.) P. Karst.: hemostasis, antitumor^{4,49}
225. *Inonotus hispidus* (Bull.) P. Karst. [= *Xanthochrous hispidus* (Bull.) Pat.]: improving digestion, hemostasis, antitumor^{4,23}
226. *Inonotus obliquus* (Ach. ex Pers.) Pilát: improving immunity, lowering blood glucose, antitumor²³
227. *Inonotus radiatus* (Sowerby) P. Karst.: antitumor²¹
228. *Irpex lacteus* (Fr.) Fr. s.l.: treating oliguria, edema, and lumbago, lowering blood pressure^{23,68,69}
229. *Ischnoderma resinosum* (Fr.) P. Karst.: antitumor⁴
230. *Laccaria amethystea* (Bull.) Murrill: antitumor^{4,6}
231. *Laccaria laccata* (Scop.) Cooke: antitumor^{4,6}
232. *Laccaria proxima* (Boud.) Pat.: antitumor^{4,6}
233. *Laccaria tortilis* (Bolton) Cooke: antitumor⁶
234. *Lactarius chichuensis* W.F. Chiu: antitumor⁴
235. *Lactarius deliciosus* (L.) Gray: antitumor⁷⁰
236. *Lactarius hatsudake* Tanaka: antitumor^{4,6}
237. *Lactarius hygrophoroides* Berk. et M.A. Curtis: antitumor⁴
238. *Lactarius lignyotus* Fr.: antitumor²¹
239. *Lactarius pallidus* Pers.: antitumor⁶
240. *Lactarius picinus* Fr.: treating lumbago and skelalgia, limb numbness³
241. *Lactarius piperatus* (L.) Pers.: treating lumbago and skelalgia, limb numbness, antitumor^{3,4}
242. *Lactarius subvellereus* Peck var. *subdistans* Hesler et A.H. Sm.: antitumor⁴
243. *Lactarius subvellereus* var. *subvellereus*: tonifying meridians and collaterals, antitumor^{3,4}
244. *Lactarius subzonarius* Hongo: antitumor⁴
245. *Lactarius vellereus* (Fr.) Fr.: treating lumbago and skelalgia, limb numbness, antitumor^{3,4}
246. *Lactarius volemus* (Fr.) Fr.: antitumor⁴
247. *Lactarius zonarius* (Bull.) Fr. [= *Lactarius insulsus* (Fr.) Fr.]: treating lumbago and skelalgia, limb numbness³
248. *Laeticorticium roseum* (Pers.) Donk [= *Aleurodiscus roseus* (Pers.) Höhn. et Litsch.]: antibiotics²¹
249. *Laetiporus sulphureus* (Bull.) Murrill: invigorating qi and replenishing blood, antitumor¹³
250. *Lampteromyces japonicus* (Kawam.) Singer: antitumor^{4,6}
251. *Lasiochaeria fenlii* Rchb.: hemostasis, detumescence, clearing the lung, detoxification, relieving sore throat^{3,34}
252. *Lentinellus cochleatus* (Pers.) P. Karst.: antitumor⁶
253. *Lentinellus micheneri* (Berk. et M.A. Curtis) Pegler [= *Lentinus omphalodes* (Fr.) Fr.]: antibacterial²¹
254. *Lentinellus ursinus* (Fr.) Kühner [= *Lentinus ursinus* (Fr.) Fr.]: antifungal²¹
255. *Lentinula edodes* (Berk.) Pegler: improving immunity, lowering cholesterol and blood pressure, antitumor⁷¹⁻⁷³
256. *Lentinus crinitus* (L.) Fr.: antibacterial, antifungal²¹
257. *Lentinus strigosus* (Schwein.) Fr. [= *Panus rudis* Fr.]: treating scabs, antitumor^{4,6}
258. *Lentinus tigrinus* (Bull.) Fr.: lowering blood glucose²¹
259. *Lentinus tuberregium* (Fr.) Fr. [= *Pleurotus tuberregium* (Rumph. : Fr.) Singer]: antitumor, antibacterial, treating cardiovascular and neurological diseases^{6,74,75}
260. *Lenzites betulina* (L.) Fr.: dispelling cold, relaxing tendons^{3,4}
261. *Lepista irina* (Fr.) H.E. Bigelow: antitumor⁶
262. *Lepista tuscina* (Fr.) Singer: antitumor⁴
263. *Lepista nuda* (Bull.) Cooke: antibacterial, antitumor^{4,76}
264. *Lepista sordida* (Fr.) Singer: calming nerves, invigorating the liver⁷⁷

265. *Leucoagaricus carneifolius* (Gillet) Wasser: antibiotics²¹
266. *Leucopaxillus giganteus* (Sowerby) Singer: invigorating qi, relieving fever, treating colds and flu, tuberculosis^{3,17}
267. *Lycoperdon asperum* (Lév.) Speg.: hemostasis, antibacterial^{6,78}
268. *Lycoperdon fuscum* Bonord.: hemostasis¹⁶
269. *Lycoperdon mammiforme* Pers.: hemostasis, antibacterial^{6,78}
270. *Lycoperdon perlatum* Pers.: detumescence, hemostasis, antibacterial, clearing the lung, relieving sore throat, detoxication⁷⁸
271. *Lycoperdon pyriforme* Schaeff.: antitumor, antibacterial, hemostasis, clearing the lung, relieving sore throat, detoxication⁷⁸
272. *Lycoperdon umbrinum* Pers.: anti-inflammatory, hemostasis, antibacterial^{6,78}
273. *Lycoperdon utriforme* Bull. [= *Calvatia caelata* (Bull.) Morgan]: anti-inflammatory, hemostasis, antibacterial, detoxication^{6,78}
274. *Lycoperdon wrightii* Berk. et M.A. Curtis: hemostasis, anti-inflammatory, antibacterial, detoxication⁷⁸
275. *Lyophyllum decastes* (Fr.) Singer [= *Lyophyllum aggregatum* (Schaeff.) Kühner]: antitumor⁶
276. *Lyophyllum semitale* (Fr.) Kühner ex Kalamees: antitumor³⁵
277. *Lyophyllum transforme* (Britzelm.) Singer: antitumor⁶
278. *Lysurus mokusin* (L.) Fr.: antitumor⁴
279. *Macrocybe gigantea* (Masse) Pegler et Lodge [= *Tricholoma giganteum* Masse]: antitumor²¹
280. *Macrocybe lobayensis* (R. Heim) Pegler et Lodge [= *Tricholoma lobayense* R. Heim]: improving immunity, antitumor²¹
281. *Macrolepiota procera* (Scop.) Singer [= *Lepiota procera* (Scop.) Gray]: promoting digestion²⁴
282. *Marasmiellus ramealis* (Bull.) Singer: antibacterial, antitumor¹³
283. *Marasmius androsaceus* (L.) Fr.: treating arthritis, antitumor^{3,4}
284. *Marasmius conigenus* (Pers.) P. Karst.: antibacterial²¹
285. *Marasmius oreades* (Bolton) Fr.: treating lumbago and skelalgia, limb numbness, antitumor³
286. *Megacollybia platyphylla* (Pers.) Kotl. et Pouzar [= *Tricholomopsis platyphylla* (Pers.) Singer]: antitumor^{4,6}
287. *Meripilus giganteus* (Pers.) P. Karst. [= *Polyporus giganteus* (Pers.) Fr.]: antitumor^{4,6}
288. *Monascus purpureus* Went.: relieving dyspepsia, promoting blood circulation, invigorating the spleen, analgesic³
289. *Monascus ruber* Tiegh.: lowering serum lipids²¹
290. *Montagnea arenaria* (DC.) Zeller: anti-inflammatory, hemostasis⁶
291. *Montagnea tenuis* (Pat.) Teng: anti-inflammatory, hemostasis⁶
292. *Morchella angusticeps* Peck: treating gastrointestinal disease¹³
293. *Morchella crassipes* (Vent.) Pers.: improving digestion, dissipating phlegm^{3,13}
294. *Morchella deliciosa* Fr.: improving digestion, dissipating phlegm^{3,13}
295. *Morchella esculenta* (L.) Pers.: tonifying intestines, dissipating phlegm, invigorating the kidney, antitumor^{34,79}
296. *Morchella hortensis* Boud.: antitumor⁵⁰
297. *Morchella vulgaris* (Pers.) Boud. [= *M. conica* Pers.]: tonifying intestines, dissipating phlegm³
298. *Mycena alcalina* (Fr.) P. Kumm.: antitumor⁶
299. *Mycena galericulata* (Scop.) Gray: antitumor⁶
300. *Mycena haematopus* (Pers.) P. Kumm.: antitumor⁶
301. *Mycena pura* (Pers.) P. Kumm.: antitumor⁶
302. *Mycena roseomarginata* Hongo: antitumor⁶
303. *Mycena subaquosa* A.H. Sm.: antitumor⁶
304. *Mycena viridimarginata* P. Karst.: antibiotics²¹
305. *Mycenastrum corium* (Guers.) Desv.: detumescence, hemostasis, detoxification, relieving sore throat³
306. *Mycetinis scorodoni* (Fr.) A.W. Wilson [= *Marasmius scorodoni* (Fr.) Fr.]: antibacterial, antifungal²¹
307. *Neobulgaria pura* (Pers.) Petr.: antibiotics²¹
308. *Neolentinus adhaerens* (Alb. et Schwein.) Redhead et Ginns [= *Lentinus adhaerens* (Alb. et Schwein.) Fr.]: antitumor⁶
309. *Neolentinus lepideus* (Fr.) Redhead et Ginns [= *Lentinus lepideus* (Fr.) Fr.]: antitumor⁴
310. *Nidula niveotomentosa* (Henn.) Lloyd: antifungal¹⁶
311. *Oligoporus obductus* (Berk.) Gilb. & Ryvarden [= *Polyporus albicans* (Imazeki) Teng]: antitumor⁴
312. *Omphalia lapidescens* (Horan.) Cohn et J. Schröt.: antitumor, anthelmintic action, improving immunity, relieving fever^{3,4,21,34}
313. *Omphalina mutila* (Fr.) P.D. Orton [= *Pleurotus mutilus* (Fr.) Gillet]: antibacterial²¹
314. *Omphalotus illudens* (Schwein.) Bresinsky et Besl.: antitumor²¹
315. *Omphalotus japonicus* (Kawam.) Kirchn. et

- O.K. Mill. [= *Pleurotus japonicus* Kawam.]: antitumor²¹
316. *Omphalotus olearius* (DC.) Singer: antibiotics²¹
317. *Onnia flavida* (Berk.) Y.C. Dai [= "*Inonotus sciurinus* Imazeki"]: antitumor⁴
318. *Onnia vallata* (Berk.) Y.C. Dai et Niemelä [= "*Inonotus orientalis* (Lloyd) Teng"]: antitumor⁴
319. *Oudemansiella mucida* (Schrad.) Höhn.: antifungal, antitumor⁶
320. *Oudemansiella radicata* (Relhan) Singer: lowering blood pressure, antitumor^{6,13}
321. *Oxyporus corticola* (Fr.) Ryvarden [= *Poria corticola* (Fr.) Sacc.]: antibacterial, antitumor⁴
322. *Panellus serotinus* (Schrad.) Kühner [= *Panellus edulis* Y.C. Dai et al.]: improving immunity, antitumor^{81,82}
323. *Panellus stipticus* (Bull.) P. Karst.: hemostasis, antitumor^{3,4}
324. *Panus conchatus* (Bull.) Fr.: treating lumbago and skelalgia, limb numbness, antitumor^{3,4}
325. *Parasola plicatilis* (Curtis) Redhead et al. [= *Coprinus plicatilis* (Curtis) Fr.]: antitumor⁶
326. *Paxillus involutus* (Batsch) Fr.: treating lumbago and skelalgia, limb numbness³
327. *Penicillium notatum* Westling: antibacterial⁵⁵
328. *Penicillium solitum* Westling: treating dermatosis and onychomycosis⁵⁵
329. *Perenniporia fraxinea* (Bull.: Fr) Ryvarden [= *Fomitopsis cytisina* (Berk.) Bondartsev et Singer]: antitumor⁴
330. *Perenniporia martius* (Berk.) Ryvarden [= *Fomes hornodermus* (Mont.) Cooke]: hemostasis, relieving itching⁴
331. *Perenniporia robiniophila* (Murrill) Rvarden: improving immunity, antitumor^{23,83,84}
332. *Perenniporia subacida* (Peck) Donk [= *Poria subacida* (Peck) Sacc.]: antitumor⁴
333. *Phaeolepiota aurea* (Matt.) Maire [= *Pholiota aurea* (Matt.) Pers.]: antitumor⁴
334. *Phaeolus schweinitzii* (Fr.) Pat. [= *Coltricia schweinitzii* (Fr.) G. Cunn.]: antitumor^{4,35}
335. *Phallus impudicus* L.: analgesic, promoting blood circulation, treating rheumatism, clearing the lung^{3,13}
336. *Phallus rubicundus* (Bosc) Fr.: detumescence³
337. *Phallus tenuis* (Fisch.) Kuntze: relieving fever, detoxification, detumescence¹⁶
338. *Phellinidium lamaense* (Murrill) Y.C. Dai [= *Phellinus lamaensis* (Murrill) Sacc. et Trotter]: antitumor⁴
339. *Phellinus baumii* Pilát [= "*P. linteus* (Berk. et M.A. Curtis) Teng"]: antitumor, lowering serum lipids, treating pneumonia^{23,85,86}
340. *Phellinus conchatus* (Pers.) Quél.: promoting blood circulation, detoxification, improving immunity, antitumor^{4,87}
341. *Phellinus fastuosus* (Lév.) Ryvarden: antibiotics²¹
342. *Phellinus gilvus* (Schwein.) Pat.: reinforcing the spleen, eliminating dampness, promoting digestion, antitumor, improving immunity^{4,87}
343. *Phellinus himalayensis* Y.C. Dai [= "*P. pini* (Brot.) A. Ames"]: antitumor, improving immunity⁴
344. *Phellinus ignarius* (L.) Quél. s.l.: hemostasis, antitumor^{23,88,89}
345. *Phellinus laevigatus* (Fr.) Bourdot et Galzin: antitumor, improving immunity^{23,87}
346. *Phellinus laricis* (Jaczewski in Pilát) Pilát: antitumor, improving immunity^{23,87}
347. *Phellinus lonicericola* Parmasto: antitumor, improving immunity^{23,87}
348. *Phellinus lundellii* Niemelä: antitumor, improving immunity^{23,87}
349. *Phellinus macgregorii* (Bres.) Ryvarden [= *Pyropolyporus macgregorii* (Bres.) Teng]: antitumor, improving immunity^{4,87}
350. *Phellinus pini* (Brot.) A. Ames: antitumor, improving immunity⁴
351. *Phellinus rimosus* (Berk.) Pilát [= *Pyropolyporus rimosus* (Berk.) Teng]: invigorating qi, replenishing the blood, improving immunity, antitumor^{4,87}
352. *Phellinus setulosus* (Lloyd) Imazeki: antitumor, improving immunity⁴
353. *Phellinus torulosus* (Pers.) Bourdot et Galzin: detoxification, treating anemia⁴
354. *Phellinus tremulae* (Bondartsev) Bondartsev et Borisov: antitumor, improving immunity²³
355. *Phellinus tuberculatus* (Baumg.) Niemelä: antitumor, improving immunity²³
356. *Phellinus vaninii* Ljub.: antitumor, improving immunity^{23,87}
357. *Phellinus yamanoi* (Imazeki) Parmasto: antitumor, improving immunity²³
358. *Phellorinia inquinans* Berk. [= *P. herculeana* (Pers.) Kreisel]: hemostasis, detumescence³
359. *Phlebia tremellosa* (Schrad.) Nakasone et Burds. [= *Merulius tremellosus* Schrad.]: antitumor, antibacterial^{4,21}
360. *Pholiota adiposa* (Batsch) P. Kumm.: antibacterial, improving immunity^{4,90}
361. *Pholiota flammans* (Batsch) P. Kumm.: antitumor⁴
362. *Pholiota highlandensis* (Peck) A.H. Sm. et Hesler [= *P. carbonaria* (Fr.) Singer]: antitumor⁶
363. *Pholiota lenta* (Pers.) Singer: antitumor⁶

364. *Pholiota lubrica* (Pers.) Singer: antitumor⁴
 365. *Pholiota microspora* (Berk.) Sacc. [= *Ph. nameko* (T. Ito) S. Ito et S. Imai]: antibacterial, antitumor^{4,91}
 366. *Pholiota populnea* (Pers.) Kuyper et Tjall.-Beuk. [= *Ph. destruens* (Brond.) Gillet]: antitumor⁶
 367. *Pholiota spumosa* (Fr.) Singer: antitumor⁶
 368. *Pholiota terrestris* Overh.: antitumor⁶
 369. *Phylloporia ribis* (Schumach.) Ryvarden: antitumor²³
 370. *Piptoporus betulinus* (Bull.) P. Karst.: antibacterial, antitumor⁹²
 371. *Pisolithus arhizus* (Scop.) Rauschert: antifungal²¹
 372. *Pisolithus tinctorius* (Pers.) Coker et Couch: detumescence, hemostasis³
 373. *Pleurotus citrinopileatus* Singer: improving immunity, lowering serum lipids, antitumor⁹³⁻⁹⁶
 374. *Pleurotus cornucopiae* (Paulet) Rolland: antitumor⁴
 375. *Pleurotus dryinus* (Pers.) P. Kumm. [= *Pleurotus corticatus* (Fr.) P. Kumm.]: treating emphysema⁶
 376. *Pleurotus dryinus* var. *ferulae* Lanzi [= "*Pleurotus ferulae* Lanzi"]): treating gastropathy⁴
 377. *Pleurotus ostreatus* (Jacq.) P. Kumm.: treating lumbago and skelalgia, limb numbness, improving the system of meridians and collaterals, antitumor^{3,4,20}
 378. *Pleurotus pulmonarius* (Fr.) Quéf.: antitumor²³
 379. *Pleurotus spodoleucus* (Fr.) Quéf.: antitumor⁴
 380. *Podaxis pistillaris* (L.) Fr.: disinfecting, clearing the lung, relieving sore throat, detoxification, hemostasis³
 381. *Podostroma yunnanensis* M. Zang: hemostasis³
 382. *Polyporus arcularius* (Batsch) Fr.: antitumor^{6,13}
 383. *Polyporus elegans* Bull.: tonifying meridians and collaterals³
 384. *Polyporus melanopus* (Pers.) Fr. [= *Polyporellus melanopus* (Pers.) P. Karst.]: antitumor⁶
 385. *Polyporus mori* (Pollini) Fr. [= *Favolus alveolaris* (DC.) Quéf.]: antitumor^{4,13}
 386. *Polyporus rhinocerus* Cooke: treating hepatopathy and gastropathy⁹⁷
 387. *Polyporus squamosus* (Huds.) Fr.: improving immunity, antitumor^{6,13,21}
 388. *Polyporus umbellatus* (Pers.) Fr.: inducing diuresis, treating hepatopathy, antitumor^{3,23}
 389. *Polyporus varius* (Pers.) Fr.: dispelling wind-evil, tonifying meridians and collaterals⁶
 390. *Postia guttulata* (Peck) Jülich [= *Tyromyces guttulatus* (Peck) Murrill]: antitumor⁶
 391. *Postia lactea* (Fr.) P. Karst. [= *Tyromyces lacteus* (Fr.) Murrill]: antitumor⁶
 392. *Pseudoclitocybe cyathiformis* (Bull.) Singer: antitumor⁶
 393. *Pseudohydnum gelatinosum* (Scop.) P. Karst.: antitumor⁶
 394. *Pseudomerulius aureus* (Fr.) Jülich [= *Merulius aureus* Fr.]: antitumor⁴
 395. *Pulveroboletus ravenelii* (Berk. et M.A. Curtis) Murrill: treating lumbago and skelalgia, limb numbness, improving the system of meridians and collaterals³
 396. *Pycnoporus cinnabarinus* (Jacq.) P. Karst. [= *Trametes cinnabarina* (Jacq.) Fr.]: relieving fever, anti-inflammatory, antitumor^{3,23}
 397. *Pycnoporus sanguineus* (L.) Murrill: antibacterial, antitumor, hemostasis, treating rheumatism, relieving itching⁴
 398. *Pyrrhoderma adamantinum* (Berk.) Imazeki [= *Pyropolyporus adamantinus* (Berk.) Teng]: treating gastropathy⁴
 399. *Ramaria apiculata* (Fr.) Donk: antitumor⁴
 400. *Ramaria aurea* (Schaeff.) Quéf.: antitumor⁶
 401. *Ramaria flava* (Schaeff.) Quéf.: antitumor⁴
 402. *Ramaria formosa* (Pers.) Quéf.: antitumor⁴
 403. *Ramaria hemirubella* R.H. Petersen et M. Zang [= *R. botrytis* (Pers.) Ricken]: antitumor⁴
 404. *Rhizopogon piceus* Berk. et M.A. Curtis: hemostasis³
 405. *Rhizopogon roseolus* (Corda) Th. Fr. [= "*R. rubescens* (Tul. et C. Tul.) Tul. et C. Tul."]: antitumor⁶
 406. *Rhodophyllum ater* Hongo: antitumor⁶
 407. *Rhodophyllum murrayi* (Berk. et M.A. Curtis) Singer: antitumor⁶
 408. *Rhodophyllum nidorosus* (Fr.) Quéf.: antitumor⁶
 409. *Rhodophyllum salmoneus* (Peck) Singer: antitumor⁶
 410. *Rigidoporus ulmarius* (Sowerby) Imazeki [= *Fomitopsis ulmaria* (Sowerby) Bondartsev et Singer]: antitumor⁴
 411. *Rozites caperatus* (Pers.) P. Karst.: antitumor⁴
 412. *Russula adusta* (Pers.) Fr.: antitumor⁴
 413. *Russula alutacea* (Fr.) Fr.: tonifying meridians and collaterals, antitumor^{3,4}
 414. *Russula aurea* Pers.: antitumor⁴
 415. *Russula crustosa* Peck: antitumor⁴
 416. *Russula cyanoxantha* (Schaeff.) Fr.: antitumor⁴
 417. *Russula delicata* Fr.: antitumor⁴
 418. *Russula densifolia* Secr. ex Gillet: treating lumbago and skelalgia, deadlimb, antitumor⁴
 419. *Russula emetica* (Schaeff.) Pers.: antitumor⁴
 420. *Russula foetens* (Pers.) Pers.: treating lumbago and skelalgia, limb numbness, antitumor⁴
 421. *Russula grata* Britzelm. [= *R. laurocerasi* Melzer]: antitumor⁴

422. *Russula integra* (L.) Fr.: treating lumbago and skelalgia, limb numbness³
423. *Russula lilacea* Quél.: antitumor⁴
424. *Russula nigricans* (Bull.) Fr.: treating lumbago and skelalgia, limb numbness, antitumor⁴
425. *Russula pseudodelica* J.E. Lange: antitumor⁴
426. *Russula queletii* Fr.: antibacterial²¹
427. *Russula rosea* Pers. [=*R. lepida* Fr.]: antitumor⁴
428. *Russula rubescens* Beardslee: antitumor⁴
429. *Russula sanguinea* (Bull.) Fr.: antitumor⁴
430. *Russula senecis* S. Imai: antitumor⁴
431. *Russula sororia* Fr.: antitumor⁴
432. *Russula subnigricans* Hongo: antitumor¹⁶
433. *Russula vesca* Fr.: promoting digestion, antitumor⁴
434. *Russula vinosa* Lindblad: treating anemia¹⁷
435. *Russula virescens* (Schaeff.) Fr.: improving eyesight, antitumor^{3,98}
436. *Russula xerampelina* (Schaeff.) Fr.: antitumor⁴
437. *Saccharomyces cerevisiae* Meyen: improving digestion⁵⁵
438. *Saccobolus violascens* Boud.: relieving fever¹⁶
439. *Sarcodon imbricatus* (L.) P. Karst.: lowering cholesterol^{6,98}
440. *Sarcodon scabrosus* (Fr.) P. Karst.: antibacterial²¹
441. *Schizophyllum commune* Fr.: Fr.: treating neurasthenia, anti-inflammatory, antitumor^{3,20,99,100}
442. *Schizostoma bailingmiaense* B. Liu et al.: hemostasis³
443. *Schizostoma dengkouense* B. Liu et al.: hemostasis³
444. *Schizostoma laceratum* Ehrenb. [=*Tulostoma laceratum* (Ehrenb.) Fr.]: disinfecting, hemostasis, detoxication³
445. *Schizostoma ulanbuhense* B. Liu et al.: hemostasis³
446. *Scleroderma areolatum* Ehrenb.: anti-inflammatory, hemostasis⁶
447. *Scleroderma bovista* Fr.: anti-inflammatory, hemostasis³
448. *Scleroderma cepa* Pers.: detoxification, detumescence, hemostasis⁴
449. *Scleroderma citrinum* Pers.: anti-inflammatory⁶
450. *Scleroderma flavidum* Ellis et Everh.: anti-inflammatory⁶
451. *Scleroderma polyrhizum* (J.F. Gmel.) Pers.: detumescence, hemostasis³
452. *Scleroderma verrucosum* (Bull.) Pers.: hemostasis⁶
453. *Sclerotinia sclerotiorum* (Lib.) de Bary: antitumor^{4,80}
454. *Sepedonium ampullosporum* Damon: improving immunity²¹
455. *Serpula lacrymans* (Wulfen) P. Karst.: antitumor^{4,80}
456. *Shiraia bambusicola* Henn.: relieving cough, tonifying meridians and collaterals, invigorating qi, replenishing the blood, promoting menstruation¹⁰¹
457. *Simblum gracile* Berk.: antitumor⁴
458. *Sparassis latifolia* Y.C. Dai et Zheng Wang: antibacterial²³
459. *Sphaerulina oryzina* Hara [=*Cercospora oryzae* T. Miyake]: antitumor⁴
460. *Sporisorium sorghi* Ehrenb. ex Link: treating dysmenorrhea⁴
461. *Stereum gausapatum* (Fr.) Fr.: antitumor⁶
462. *Stereum hirsutum* (Willd.) Pers.: antitumor^{4,35}
463. *Strobilomyces strobilaceus* (Scop.) Berk.: antitumor^{4,6}
464. *Stropharia rugosoannulata* Farl. ex Murrill: antitumor¹⁶
465. *Stropharia squamosa* (Pers.) Quél.: antitumor⁶
466. *Suillus bovinus* (L.) Roussel: antitumor^{4,13}
467. *Suillus granulatus* (L.) Roussel: treating Kaschin-Beck's disease, antitumor^{3,4}
468. *Suillus grevillei* (Klotzsch) Singer: treating lumbago and skelalgia, limb numbness, antitumor³
469. *Suillus luteus* (L.) Roussel: treating Kaschin-Beck's disease, antitumor^{3,4}
470. *Suillus viscidus* (L.) Fr. [=*Suillus aeruginascens* Secr. ex Snell =*S. laricinus* (Berk.) Kuntze]: antitumor^{4,49}
471. *Taiwanofungus camphoratus* (M. Zang et C.H. Su) Sheng H. Wu et al.: antitumor^{102,103}
472. *Tephroclype anthracophila* (Lasch) P.D. Orton [=*Lyophyllum carbonarium* (Velen.) M.M. Moser]: antitumor⁶
473. *Terfezia arenaria* (Moris) Trappe [=*T. leonis* (Tul. et C. Tul.) Tul.]: antitumor⁴
474. *Termitomyces eurhizus* (Berk.) R. Heim: improving the stomach, treating hemorrhoids, antitumor^{3,14}
475. *Thelephora vialis* Schwein.: treating lumbago and skelalgia, limb numbness³
476. *Trametes elegans* (Spreng.) Fr. [=*T. palisotii* (Fr.) Imazeki]: dispelling pathogenic wind, relieving itching⁴
477. *Trametes gibbosa* (Pers.) Fr.: antitumor^{4,35}
478. *Trametes hirsuta* (Wulfen) Pilát [=*Coriolus hirsutus* (Wulfen) Pat.]: treating rheumatism, relieving cough, antitumor^{4,35}
479. *Trametes orientalis* (Yasuda) Imazeki [=*Coriolopsis occidentalis* (Klotzsch) Murrill]: treating pulmonary diseases, antitumor⁴
480. *Trametes pubescens* (Schumach.) Pilát [=*Tyromyces pubescens* (Schumach.) Imazeki]: antitumor⁴
481. *Trametes versicolor* (L.) Lloyd [=*Coriolus versicolor* (L.) Quél.]: relieving fever, treating hepatopathy, anti-inflammatory, antitumor^{104,105}

482. *Tremella aurantia* Schwein.: dissipating phlegm, relieving cough, lowering blood pressure, antitumor^{3,4}
483. *Tremella aurantialba* Bandoni et M. Zang: treating breathlessness, dissipating phlegm, treating tracheitis, antihypertensive^{17,34,106}
484. *Tremella foliacea* Pers.: treating gynecopathy⁶
485. *Tremella fuciformis* Berk.: invigorating the kidney, moistening the lung, relieving fever^{4,107}
486. *Tremella mesenterica* Retz.: Fr. [= *T. lulescens* Pers.]: treating neurasthenia and breathlessness, antihypertensive¹⁷
487. *Tremella samoensis* Lloyd [= *T. cinnabarina* (Mont.) Pat.]: invigorating qi⁴
488. *Tremella sanguinea* Y.B. Peng: treating gynecopathy⁶
489. *Tremiscus helvelloides* (DC.) Donk [= *Phlogiotis helvelloides* (DC.) G.W. Martin]: antitumor⁶
490. *Trichaptum abietinum* (Pers.) Ryvar den [= *Hirschioporus abietinus* (Pers.) Donk]: antitumor^{6,13}
491. *Trichaptum bifforme* (Fr.) Ryvar den [= *Coriolus biformis* (Fr.) Pat.]: antibacterial, antifungal, antitumor^{4,13}
492. *Trichaptum byssogenum* (Jungh.) Ryvar den [= *Hirschioporus versatilis* (Berk.) Imazeki]: antitumor^{6,13}
493. *Trichaptum fuscoviolaceum* (Ehrenb.) Ryvar den [= *Hirschioporus fuscoviolaceus* (Ehrenb.) Donk]: antitumor⁴
494. *Tricholoma acerbum* (Bull.) Vent.: antitumor⁴
495. *Tricholoma albobrunneum* (Pers.) P. Kumm.: antitumor⁴
496. *Tricholoma album* (Schaeff.) P. Kumm.: antitumor⁴
497. *Tricholoma bakamatsutake* Hongo: antitumor⁶
498. *Tricholoma flavovirens* (Pers.) S. Lundell: antitumor⁶
499. *Tricholoma fulvum* (Bull.) Sacc.: antitumor⁴
500. *Tricholoma matsutake* (S. Ito et S. Imai) Singer: invigorating the stomach, treating bronchitis, antitumor^{3,4,108}
501. *Tricholoma mongolicum* S. Imai: relieving fever, treating measles³
502. *Tricholoma muscarium* A. Kawam: antitumor^{4,6}
503. *Tricholoma orirubens* Quél.: antitumor⁶
504. *Tricholoma populinum* J.E. Lange: treating hypersensitivity vasculitis⁶
505. *Tricholoma portentosum* (Fr.) Quél.: antitumor⁶
506. *Tricholoma robustum* (Alb. et Schwein.) Ricken: antitumor^{4,65}
507. *Tricholoma saponaceum* (Fr.) P. Kumm.: antibacterial⁶
508. *Tricholoma sejunctum* (Sowerby) Quél.: antitumor⁶
509. *Tricholoma sulphureum* (Bull.) P. Kumm.: antitumor⁶
510. *Tricholoma ustale* (Fr.) P. Kumm.: antitumor⁴
511. *Tricholoma vaccinum* (Schaeff.) P. Kumm.: antitumor⁴
512. *Tricholoma virgatum* (Fr.) P. Kumm.: antitumor⁴
513. *Tricholomopsis bambusina* Hongo: antitumor⁶
514. *Tuber indicum* Cooke et Massee: antitumor¹⁶
515. *Tulostoma brevistipitatum* B. Liu et al.: hemostasis³
516. *Tulostoma brumale* Pers.: hemostasis³
517. *Tulostoma cretaceum* Long: hemostasis^{3,109}
518. *Tulostoma helarshanense* B. Liu et al.: hemostasis³
519. *Tulostoma jourdanii* Pat.: detumescence, hemostasis, clearing the lung, relieving sore throat, detoxication³
520. *Tulostoma kotlabae* Pouzar: hemostasis, anti-inflammatory⁶
521. *Tulostoma lloydii* Bres.: hemostasis^{3,109}
522. *Tulostoma sabulosum* B. Liu et al.: hemostasis³
523. *Tulostoma verrucosum* Morgan: hemostasis^{3,109}
524. *Tylophilus felleus* (Bull.) P. Karst.: anti-inflammatory, treating hepatopathy¹⁶
525. *Ustilago inoidea virens* (Cooke) Takah.: anti-inflammatory³
526. *Ustilago crameri* Körn.: improving digestion^{3,4}
527. *Ustilago esculenta* Henn.: treating red eyes due to wind-heat⁴
528. *Ustilago maydis* (DC.) Corda: treating hepatopathy and neurasthenia^{3,4}
529. *Ustilago nuda* (C.N. Jensen) Rostr.: diaphoresis, analgesic^{3,4}
530. *Ustilago tritici* C. Bauhin: diaphoresis, analgesic⁴
531. *Volvariella volvacea* (Bull.) Singer: treating scurvy, antitumor³
532. *Wolfiporia cocos* (Schwein.) Ryvar den et Gilb. [= *Poria cocos* (Schwein.) F.A. Wolf]: relieving cough, inducing diuresis, calming nerves, relieving fever, antitumor^{3,4,34}
533. *Xerocomus nigromaculatus* Hongo: antitumor³
534. *Xeromphalina campanella* (Batsch) Maire: antitumor^{13,14}
535. *Xylaria longipes* Nitschke: antifungal¹⁶
536. *Xylaria nigripes* (Klotzsch) Sacc.: inducing diuresis, invigorating the kidney, improving immunity^{3,110}
537. *Xylaria sanchezii* Lloyd: inducing diuresis⁶
538. *Xylobolus annosus* (Berk. et Broome) Boidin [= *Stereum annosum* Berk. et Broome]: antitumor⁶
539. *Xylobolus frustulatus* (Pers.) Boidin [= *Stereum frustulatum* (Pers.) Fr.]: antitumor⁶
540. *Xylobolus subpileatus* (Berk. et M.A. Curtis) Boidin [= *Lloydella subpileata* (Berk. et M.A. Curtis) Höhn. et Litsch.]: antitumor⁴

III. DISCUSSION

A. Diversity of Medicinal Mushrooms and Fungi

Five hundred-forty species belonging to 10 classes, 26 orders, 76 families, and 199 genera of two phyla (Ascomycota, Basidiomycota) have been recorded with medicinal values in China. Most are Basidiomycetes (482 species), which comprise approximately 89% of all the Chinese medicinal fungi, and 11% are Ascomycetes (58 species). Ninety-seven percent of the Basidiomycetes are in the class Agaricomycetes (468 species), and 89% are in the five orders of Agaricales (217 species), Polyporales (82 species), Russulales (55 species), Boletales (40 species), and Hymenochaetales (36 species). Among the Ascomycetes, 67% are in the class Sordariomycetes (39 species), and 53% are in the order Hypocreales (31 species).

According to our analyses, there are 540 species reported by Chinese scientists as medicinal. It was also found that Mexico has more than 70 mushroom species that are used for medicinal purposes¹¹; around 150 fungi taxa belonging to 87 genera have been reported as medicinal fungi from western Canada,¹² and 404 fungal species from 160 genera were listed as medicinal fungi in South Korea.³⁵ Therefore, in comparison, China has the richest diversity of medicinal fungi, so far.

B. Diversity of Medicinal Functions

One hundred twenty-six medicinal functions are thought to be provided by 540 medicinal fungi, among them the most common function is antitumor: 331 (61% of the total medicinal species) can be used as antitumor agents. Other common functions are hemostasis, antibacterial, improving immunity, detoxication, and anti-inflammatory, produced by 65, 50, 40, 29, and 27 species, respectively.

C. The Most Important or Commonly Used Medicinal Mushrooms and Fungi

The most important or commonly used medicinal fungi are *Armillaria tabescens*, *Cordyceps militaris*,

C. sinensis, *Ganoderma lucidum*, *Ganoderma multipileum*, *Grifola frondosa*, *Hericium erinaceus*, *Polyporus umbellatus*, *Marasmius androsaceus*, *Schizophyllum commune*, *Shiraia bambusicola*, *Taiwanofungus camphoratus*, *Trametes versicolor*, *Tremella fuciformis* and *Wolfiporia cocos*. The price for the wild fruitbody of *Taiwanofungus camphoratus* is up to \$3000 USD/kg. Many products from *Ganoderma lucidum*, *Hericium erinaceus*, and *Trametes versicolor* are available in the Chinese pharmacy.

D. The Cultivated Medicinal Mushrooms and Fungi

Twenty-six medicinal fungi are commonly cultivated in China as food or for medicinal products. The commonly cultivated species are *Agaricus bisporus*, *A. brasiliensis*, *Agrocybe cylindracea*, *Auricularia auricula-judae*, *A. polytricha*, *Coprinus comatus*, *Cordyceps militaris*, *Dictyophora indusiata*, *Flammulina velutipes*, *Ganoderma lucidum*, *Gloeostereum incarnatum*, *Grifola frondosa*, *Herichium erinaceus*, *Hypsizygus marmoreus*, *Lentinus edodes*, *Morchella esculenta*, *Panellus serotinus*, *Phellinus vaninii*, *Pholiota adiposa*, *Ph. microspora*, *Pleurotus citrinopileatus*, *P. ostreatus*, *P. ferulae*, *Stropharia rugosoannulata*, *Tremella fuciformis*, and *Volvariella volvacea*.

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