The Therapeutic Potential of Coriolus & Hericium Mushroom Nutrition in Neurodegenerative Conditions

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The Potential of Mushroom Nutrition in Neurodegenerative Conditions

* NEURODEGENERATIVE CONDITIONS WORLDWIDE
* RESEARCH ON MEDICINAL MUSHROOMS
* NEUROPROTECTIVE POSSIBILITIES

* CAUSATIVE FACTORS IN NEURODEGENERATIVE CONDITIONS
* RISK FACTORS
* SYMPTOMS AND SIGNS
* COMPLICATIONS

* MUSHROOM NUTRITION TREATMENTS
The Potential of Mushroom Nutrition in Neurodegenerative Conditions

• In 2015, one estimate is that 46.8 million persons have dementia worldwide; this number is expected to grow to 131.5 million by 2050.[2]

• Five (5) per cent of people from age sixty-five (65) to seventy-four (74) have Alzheimer’s, but more than fifty (50) per cent of those over eighty-five (85) have it, even if they have no obvious risk factors.[3]
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• The estimated cost of dementia is estimated to be $816 billion and expected to grow to 1 trillion by 2018.[4]

• Furthermore, a UK study estimates that the health and social costs for dementia almost match the combined cost of cancer, heart disease and stroke.[5]

• In sum, the economic cost of Alzheimer’s (AD) is staggering and threatens the healthcare budgets of many countries.
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- In 2014, one of the objectives of the Global Action Against Dementia was to identify a cure or disease-modifying therapy for dementia by 2015.

- The objective of this paper is to propose a disease-modifying therapy for neurodegenerative diseases based on the use of mushroom nutrition.
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- Alzheimer’s disease (AD) and other neurodegenerative conditions like ALS are multifactorial disorders (Figure 1). Mixed pathology dementias account for half or more of all dementia cases, with the presence of beta-amyloid and vascular disease constituting the most frequent combination of pathologies. Atherosclerosis, arteriosclerosis, micro-infarcts, silent stroke, and diffuse white matter disease are all associated with increased risk of the brain cells.
A NEW ROLE FOR MEDICINAL MADE BIOMASS MUSHROOMS

BACKGROUND

A possible link between Herpes Simplex Virus (HSV-1) and Alzheimer’s was demonstrated in studies at California University (2000) in the USA and Manchester University in the UK (2008).

At Catania University, Italy, it was found that Coriolus versicolor biomass may stimulate Lipoxin LXA4 in microglia (these perform active vigilance of the cerebral tissue and of the spinal medullae, thus the immune resistant cells of the Central Nervous System), therefore, indirectly, reduce the symptoms of Alzheimer’s disease on its initial stages.
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SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

Objectives of studies at Catania University, Italy

To focus on molecules capable of activating the system of Vitagenes, as a new model of therapeutic impact, in order to minimize the detrimental consequences associated with free radicals that induce neurodegenerative cellular damage.

Lipoxin A4 (LXA4) from mushrooms is one endogenous eicosanoid fatty acids. These are signaling molecules exerting complex control over many bodily systems; mainly in growth during and after physical activity, inflammation or immunity after the intake of toxic compounds and pathogens, and as messengers in the central nervous system.
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SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

Redox modulation of cellular stress response and lipoxin A4 expression by *Coriolus versicolor* in rat brain: Relevance to Alzheimer’s disease pathogenesis,
*Trovato et al., Neurotoxicology 2015*

Redox modulation of cellular stress response and lipoxin A4 expression by *Hericium erinaceus* in rat brain: Relevance to Alzheimer’s disease pathogenesis,
*Trovato et al., Immunity & Aging 2016*

Supplementation with *Hericium erinaceus* and *Coriolus versicolor* to Inhibit Progression of Alzheimer’s Disease,
*Calabrese & Ontario, Clinical Journal of Mycology Vol V, Januar 2016*
Dr. LaFerla and his researchers demonstrated that aspirin-triggered Lipoxin A4 (LXA4), twice a day,

- reduced NF kB (Nuclear Factor Kappa B) activation (most important factor causing inflammation in the body)
- reduced pro-inflammatory cytokines and chemokines
- reduced increased levels of anti-inflammatory IL-10 and transforming the grow factor β (4)

In effect, the researchers contend that activating LXA4 signalling may represent a novel therapeutic approach for AD.

Since 2014, a group of researchers (led by Professor Vittorio Calabrese) from the Universities of Catania and Messina, made their goal to determine if *Coriolus versicolor* biomass and *Hericium erinaceus* biomass could stimulate Lipoxin A4 (LXA4) activation in both peripheral blood and in the CNS of rats treated with an equivalent human dose of 3g per day given, orally.
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SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

Given the potential gastrointestinal discomfort associated with aspirin intake, is there another manner to increase LXA4 in the brain as well as provide both anti-viral protection and anti-oxidant protection?

In the past fifteen years, the clinical development of mushroom nutrition has determined that

- *Coriolus versicolor* (biomass) has viral protective properties,
- while *Hericium erinaceus* (biomass) is extremely high in Superoxide Dismutase (SOD) content.
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SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

• Additionally, *Coriolus versicolor* biomass is used to increase the regression rate of LSIL lesions in HPV patients and to significantly reduce the HPV viral load in LSIL HPV patients.[4,5,6]
  
  
  

• *Additional, Hericium erinaceus* biomass has an extremely high Superoxide Dismutase (SOD) content, which in the presence of *in vitro* proteolytic enzymes (per 500 mg tablet) has a SOD content of 19.430 $10^3$ U.[7]

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SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

• Since 2014, a group of researchers (led by Professor Vittorio Calabrese) from the Universities of Catania and Messina, made their goal to determine if *Coriolus versicolor* biomass and *Hericium erinaceus* biomass could stimulate Lipoxin A4 (LXA4) activation in both peripheral blood and in the CNS of rats treated with an equivalent human dose of 3g per day given, orally.

• In one study, a group of rats were supplemented with *Coriolus versicolor* biomass and another group (Control) that was not supplemented over 30 days (N=10).

• In another study, one group of rats were supplemented with *Hericium erinaceus* biomass and another group (Control) that was not supplemented over 90 days (N=10).
SCIENTIFIC STUDIES ON MUSHROOM NUTRITION

• At the end of experimental periods for the Coriolus (30 days) and Hericium (90 days) studies, animals were sacrificed and the activity of LXA4 was determined in serum, lymphocytes and in different brain regions (cortex, striatum, substantia nigra, hippocampus and cerebellum) and compared with LXA4 of untreated animals, as control.

• The researchers also focused on the impact of each mushroom on redox-dependent genes, called vitagenes, including heat shock proteins (Hsps), sirtuins, thioredoxin (TrX) and lipoxin A4 (LXA4).

• The differences in the up-regulation of the following vitagenes were measured:
  • a. Lipoxin A4 (LXA4)
  • b. Heme Oxygenase-1 (HO-1);
  • c. Heat Shock Protein 70 (HSP 70).
  • d. Thioredoxin TrX
A summary of the results from the Coriolus study are:

LXA4 Distribution in the different regions of the brain of Male Sprague-Dowley rats (8)

<table>
<thead>
<tr>
<th>Region</th>
<th>Control</th>
<th>Coriolus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortex</td>
<td>160</td>
<td>210</td>
</tr>
<tr>
<td>Hipocampus</td>
<td>140</td>
<td>200</td>
</tr>
<tr>
<td>cerebelum</td>
<td>175</td>
<td>190</td>
</tr>
<tr>
<td>Total Brain</td>
<td>150</td>
<td>200</td>
</tr>
</tbody>
</table>

The Potential of Mushroom Nutrition in Neurodegenerative Conditions

A summary of the results from the Coriolus study are:

**LXA4 Distribution in the rest of the body of Male Sprague-Dowley rats** (8)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Coriolus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td>400</td>
<td>510</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>140</td>
<td>175</td>
</tr>
<tr>
<td>Liver</td>
<td>387</td>
<td>125</td>
</tr>
<tr>
<td>Kidney</td>
<td>100</td>
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The Potential of Mushroom Nutrition in Neurodegenerative Conditions

A summary of the results from the Coriolus study are:

In addition, there was a significant increase in

- heme oxygenase-1,
- Hsp 70 and
- thioredoxin
- in the total brain of Coriolus-fed rats when compared to a control group.[8]

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The Potential of Mushroom Nutrition in Neurodegenerative Conditions

A summary of the results from the Coriolus study are:

Heme-oxygenase1, HSP-70 e TrX in the Brain of Male Sprague-Dowley rats (8)

<table>
<thead>
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<th>After 30 days</th>
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<tbody>
<tr>
<td>HO-1</td>
<td>180</td>
<td>260</td>
</tr>
<tr>
<td>Hsp-70</td>
<td>105</td>
<td>140</td>
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A summary of the results from the *Hericium* study are:

**LXA4 Distribution in the different regions of the brain of Male Sprague-Dowley rats**

(9)

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<td>170</td>
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**LXA4 Distribution in the rest of the body of Male Sprague-Dowley rats** (9)

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In addition, there was a significant increase in

- heme oxygenase-1,
- Hsp 70 and
- thioredoxin
- in the total brain of *Hericium*-fed rats when compared to a control group.[9]

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A summary of the results from the Hericium study are:

Heme-oxygenase1, HSP-70 e TrX in the Brain of Male Sprague-Dowley rats (9)

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<td>124</td>
<td>275</td>
</tr>
<tr>
<td>TrX</td>
<td>100</td>
<td>160</td>
</tr>
</tbody>
</table>

Conclusions

• In separate studies, *Coriolus versicolor* and *Hericium erinaceus* biomass supplementation demonstrated a significant up-regulation of LXA4 in the brain in rats when compared to a control group.

• In the *Coriolus versicolor biomass* study the increase was measured at the end of 30 days,

• while in the *Hericium erinaceus biomass* study, the final results were retrieved at the end of 90 days.
Conclusions

• These findings indicate the powerful therapeutic potential of mushroom nutrition supplementation in the control of neuro-inflammatory alterations and neurodegenerative conditions like AD, ALS etc.

• Further studies in human models should be conducted in early stage Alzheimer’s disease patients with potential impact on the course and the progression of the disease ie. Mild Cognitive Impairment.
RECOMMENDATIONS

Subject to further clinical research, the recommended application of mushroom nutrition should be to those patients identified as:

- a) having a family history of AD, ALS ...
- b) having been diagnosed with Mild Cognitive Impairment (MCI) and
- c) having high viral levels of HSV-1, HSV-2 or CMV.

Recommended supplementation should be:
- Coriolus - 3g/day (six tablets (500 mg).
- Hericium - 3g/day (six tablets (500 mg).
  1,5g (3 tablets) before breakfast and 1,5g (3 tablets) before lunch.

Cost of supplementation would be £ 80.00 plus VAT (20%) per month or £ 100.00 per month including VAT.

Or £ 3.33 per day.
Mushroom Nutrition in Neurodegenerative Conditions

Coriolus versicolor  Hericium erinaceus

THANK YOU

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Medicinal Biomass Mushrooms Information: www.mycologyresearch.com

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