The health effects of moderate wine consumption

Sabina Passamonti
Department of Life Sciences
The problem with wine drinking

*Wine contains a drug named alcohol (12%)*

*This drug causes first pleasure, then harm*

Pleasure causes psychological and physical dependence

↓

*ALCOHOLISM*

Pleasure is sought at any cost: excess drinking
The problem with wine drinking

According to the World Health Organization, ALCOHOL KILLS approximately 2.5 million people each year worldwide, causing 4% of all deaths - more than violence, AIDS, or tuberculosis.
The problem with wine drinking

Wine is freely accessible and consumed – a good business

PUBLIC HEALTH CONCERN

What advice should be given?
Should the wine economy be closed and replaced?
Is there any hidden effect on health due to habitual wine drinking?
The problem with wine drinking

PUBLIC HEALTH CONCERN

addressed by

PUBLIC FUNDED RESEARCH WORLDWIDE
The problem with wine drinking

THE POISON
Economic cost > $ 234 billions/yr in USA

The harmful use of alcohol is the world’s leading risk factor for death among males (15-59 years), mainly due to:

- accidents, injuries, violence,
- cardiovascular diseases,
- cirrhosis,
- seizures,
- stroke,
- poisonings,
- many cancers.

THE REMEDY
Economic gain (to be calculated)

Light to moderate drinking ensures substantial reductions of:

- cardiovascular disease,
- diabetes mellitus,
- stroke, and
- total mortality.
Alcohol as a poison, though there are exceptions

*check below*

Fig. 1. Relative risk functions and corresponding 95% confidence intervals describing the dose-response relationship between alcohol consumption and the risk of 15 alcohol-related conditions obtained by fitting meta-regression models.
The unexpect effect of alcohol drinks on mortality

A remedy only if **A Drink A Day**

1 drink = 14 g of ethanol
- 360 ml beer
- 150 ml wine
- 45 ml spirit
Lower risk of mortality is due in part to less cardiovascular diseases

**block of coronary arteries → myocardial infarction**

Coronary heart disease is decreased by 2 small glasses of wine (20 g ethanol) every day. This beneficial effect is lost by 5-6 small glasses of wine (72-89 g)


Fig. 2. Relative risk function and corresponding 95% confidence intervals describing the dose-response relationship between alcohol consumption and the risk of coronary heart disease.
Less risk of myocardial infarction by 1-2 drinks a day
Less risk of ischemic stroke by 2-4 drinks a day

*block of brain arteries → stroke*

Stroke is decreased by 2-3 drinks of wine every day.
This beneficial effect is lost by doubling the daily drinks.
Less risk of hypertension by 1 drink a day

Stiffness of arteries → hypertension → arterial injury → coronary disease → heart attack, stroke, etc.

Hypertension is decreased by 1 small glasses of RED wine every day.

This beneficial effect is not seen with WHITE wine.
What is the magic in wine?

*Alcohol or not alcohol?*

From epidemiological studies to experimental studies
From observations to explanations

My work within my network
In isolated aortic rings, anthocyanins cause relaxation, thus more blood is delivered.

Work done at the University of Strasbourg (France) and Ljubljana (Slovenia)

Relaxation is reduced if polyphenols/anthocyanins cannot enter into the cells lining the inner aortic ring (vascular endothelial cells)

Special reagent provided by my lab
Is cyanidin 3-glucoside cardioprotective?

**Test in the isolated, ischemic rat heart**

1. explantation
2. adaptation out of the body, perfusion with oxygen
3. ischemia (no oxygen)
4. reperfusion with oxygen

This simulates a heart attack / myocardial infarction

Let’s see if a wine pigment protects the heart

LDH is a marker of myocardial cell death. It is released by the ischemic heart. However, cyanidin 3-glucoside prevents cell death.

Co, control (■); Ab (○), pre-incubated bilitranslocase antibody

C3G (1 µmol/L, ◇; 10 µmol/L, ◄)

after explantation, adaptation phase

reperfusion phase
Cyanidin 3-glucoside protects against ischemic arrhythmia
1-3 drinks/day reduces the risk of developing diabetes
In diabetic subjects, “... no grounds to discourage mild to moderate alcohol consumption.”

Data from: Blomster et al. The Relationship Between Alcohol Consumption and Vascular Complications and Mortality in Individuals With Type 2 Diabetes. Diabetes Care 2014;37:1353–1359
Health risk in late years

Dementia

confusion, loss of memory, troubles in carrying out normal tasks, ...
Percent of people with signs of dementia in OECD countries

Figure 11.11 Estimated number of people with dementia in all OECD countries, by age, 1995, 2015 and 2035

Source: OECD analysis of data from Prince et al. (2013) and the United Nations.

Statlink ➤ http://dx.doi.org/10.1787/888933281401
Some cardiovascular drugs might cause dementia
WHAT DIET DOES PROTECT AGAINST SENILE DEMENTIA?
Study on elderly in two provinces of South-East of France

<table>
<thead>
<tr>
<th>Table 1. Baseline characteristics of the sample according to flavonoid intake, PAQUID* study (n = 1,640), France, 1991–2001</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flavonoid quartile (mg/day)</strong></td>
</tr>
<tr>
<td>0–10.39</td>
</tr>
<tr>
<td>No.</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Sex (men)</td>
</tr>
<tr>
<td>128</td>
</tr>
<tr>
<td>Low educational level</td>
</tr>
<tr>
<td>167</td>
</tr>
<tr>
<td>Smoking status</td>
</tr>
<tr>
<td>Smokers</td>
</tr>
<tr>
<td>32</td>
</tr>
<tr>
<td>Former smokers</td>
</tr>
<tr>
<td>87</td>
</tr>
<tr>
<td>Never smokers</td>
</tr>
<tr>
<td>291</td>
</tr>
<tr>
<td>Flavonoid quartile (mg/day)</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>77.74</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
</tr>
<tr>
<td>24.48</td>
</tr>
<tr>
<td>Fruits (g/day)</td>
</tr>
<tr>
<td>175.2</td>
</tr>
<tr>
<td>Vegetables (g/day)</td>
</tr>
<tr>
<td>187.6</td>
</tr>
<tr>
<td>Mini-Mental State (score)</td>
</tr>
<tr>
<td>26.54</td>
</tr>
<tr>
<td>“Isaacs” Set Test (score)</td>
</tr>
<tr>
<td>27.84</td>
</tr>
<tr>
<td>Benton’s Visual Retention Test (score)</td>
</tr>
<tr>
<td>10.71</td>
</tr>
</tbody>
</table>

* PAQUID, Personnes Agées Quid; SD, standard deviation.
Scores of cognitive tests decline with age, though less if diet is rich in fruits and vegetables.

**FIGURE 1.** Evolution of the mean MMSE score for persons in quartiles 1–4 of flavonoid intake estimated with a linear mixed model, PAQUID study, France, 1991–2001. Examples for men aged 65–70 years at baseline, who had a high educational level, were nonsmokers, and had a normal body mass index and average fruit (296.15 g/day) and vegetable (242.44 g/day) consumption. MMSE, Mini-Mental State Examination; PAQUID, Personnes Âgées Quid.
Does wine cause dementia?

![Graph showing relative risk of dementia and Alzheimer's disease with wine consumption.](image)

Relative risk

Wine drinks/day

- Rischio demenza
- Rischio morbo di Alzheimer

LETENNEUR Biol Res 37, 2004, 189-193
Review of 143 studies that described the relationship between moderate drinking of alcohol and some aspect of cognition

*Light to moderate drinking:*

1. *Does not impair cognition in younger subject.*
2. *Reduce the risk of dementia and cognitive decline in older subjects.*

Moderate alcohol consumption and cognitive risk.
Neafsey EJ, Collins MA.
Cognitive decline is reduced by other life-style factors

Relative risk of cognitive decline - dementia


Thus, the effect is not strange
Wine and mind

Some wine polyphenols

Cyanidin 3-glucoside  catechin gallate  rutin
Anthocyanins are neuroprotective


... and other 20 research papers (not listed here)
Do anthocyanins reach the brain?

The brain is very protected

98% of compounds found in blood do not enter the brain
Wine polyphenols must pass the blood-brain barrier
**Test in anaesthetised rats**

A mix of anthocyanins is given in the stomach. 10 min later, anthocyanins are found in the brain of most animals.

Let’s see how much of cyanidin 3-glucoside in the blood can cross the barrier and go to the brain.

Rapid distribution of C3G in the brain, with an apparently constant plasma/brain ratio in the physiologically relevant plasma concentration range (19–355 nM).

Most wine polyphenols are not absorbed in the intestine

... they stay in the colon and are cut in molecular fragments
Some of these fragments can reach the brain… and they help neurons grow better.

Gasperotti, M. et al. Fate of Microbial Metabolites of Dietary Polyphenols in Rats: Is the Brain Their Target Destination? ACS chem Neurosci 6, 1341–1352
CONCLUSIONS

There is reasonable unanimity in beneficial effects of moderate wine consumption in cardiovascular disease, diabetes, osteoporosis, maybe neurological diseases, and longevity.


The idea of a total prohibition of alcohol consumption (including moderate consumption with meals) appears over dimensioned, poorly feasible and scientifically not sound.

Nutrition, Metabolism & Cardiovascular Diseases (2014) 24, e2-e26
благодарение

THANK YOU FOR YOUR ATTENTION
Thanks to all my co-authors and collaborators

- Agricultural Institute of Slovenia
  - Andreja Vanzo, Klemen Lisjak
- Agricultural Institute of San Michele all’Adige (Italy)
  - Fulvio Mattivi, Urska Vrhovsek
- University of Ljubljana, Faculty of Medicine, Institute of Pharmacology
  - Lovro Ziberna
- University of Trieste (Italy),
  - Federica Tramer, Stefano Fornasaro, and many young researchers
- Trans2Care network (www.trans2care.eu)
- Agrotur network (www.agrotur.si)