

## SPECIAL ARTICLE

# Hypothesis: Is heroin a 'barrier' against cancer ? A retrospective analysis of heroin-addicted individuals untreated for opioid dependence between 2001-2010

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## Summary

**Purpose:** The findings of previous studies attracted our interest in searching and defining the percentage of deaths from cancer in 'heroin regular addicts' i.e. those who had never stopped taking the drug since they started.

**Methods:** The archives of the Greek Reitox Focal Point of the years 2001 to 2010 were retrospectively searched, focusing on the number of deaths from cancer of the regular heroin addicts.

**Results:** The records from 2,321 regular heroin addicts showed that none of them died from cancer. It seems that heroin might act as a "barrier" against cancer.

**Conclusion:** Further studies are needed to confirm our results and to explore the potential cause for this surprising finding.

**Key words:** addiction, cancer, heroin, phosphorous, retrospective

## Introduction

The amount of phosphorus in the blood, besides cancer, is influenced by many conditions, such as pregnancy, hormones, environment, nutrition, feverish diseases, liver cirrhosis, pharmaceutical products like narcotics and pain-relief drugs, which have been previously extensively investigated [1,2]. However, to the best of our knowledge, as far as heroin is concerned, it has not been done much concerning laboratory values, such as phosphorus.

In a previous study phosphorus in the blood of regular heroin addicts and that of healthy subjects was compared and the results showed no significant difference between the two groups. Serum phosphorous remained in normal range for heroin addicted subjects, despite the disturbances caused

from heroin to the organism [3]. Moreover, we have already reported that the increased level of phosphorus in the blood, after exclusion of other conditions creating relevant elevation, could be indicative for the existence of cancer somewhere in the body [4].

The above findings triggered our interest for a further search, putting the question : 'Since there is no difference in the amount of phosphorus in the blood of healthy individuals and heroin addicts, in what percentage do the addicts get cancer' ?

## Methods

In order to answer the aforementioned question,

an extensive retrospective search was undertaken.

The archives of the Organization Against Drugs and the Greek Reitox Focal Point of the years 2001 to 2010 concerning the number of cancer-related deaths of the regular heroin addicts were searched. The term 'regular heroin addict' is used because, if an heroin user had stopped, even for a short time, taking the drug and started again, then he/she may react differently by means of laboratory values. Especially, serum phosphorus normal values ranged from 2.4-4.1 mg/dL. Since this was a retrospective study, no approval of the ethics committee was needed, while the study was specifically waived from the Institutional Review Board (IRB).

## Results

The patient characteristics along with the results are shown in Table 1. As expected, the majority of deaths were related to heroin usage. As it can be seen in 2394 regular heroin addicts of one decade (2001-2010) there was not even one death from cancer. Surprisingly, even in ages over 31, the non-heroin related deaths were referred to either other narcotics (cocaine, etc), or hepatitis, or liver cirrhosis, or car accidents, or AIDS, but none to cancer.

## Discussion

There is an old saying 'every cloud has a sil-

ver lining'; we have the impression that this saying suits to heroin, as far as cancer is concerned! According to the results that the level of phosphorus in the blood of regular heroin addicts was in normal levels and among 2394 heroin addicts deaths there was not even one death from cancer, drove us to hypothesise that, probably, heroin might act as a 'barrier' against cancer. One possible explanation might be a potential correlation of serum phosphorous and the development of cancer. Rapidly proliferating cancer cells require a high amount of ribosomes and other P-rich RNA components that are necessary to create proteins [5]. Consequently, as it is already known, tumor cells are richer in phosphorous than the surrounding tissue, and promote their metastasis because of their nutrient demands [6]. Since tumor cells typically upregulate ribosome biogenesis, it would be expected that the fastest growing cancer cells would become phosphorus-depleted with time, while cancer cells require high amounts of phosphorous in order to maintain their growth as well as to metastasize [6-8]. In a previous study we showed the prognostic significance of serum phosphorus in lung cancer patients, by means of an increase of serum phosphorus in early stage and a decrease in advanced stage. Since heroin blocks the excess amount of serum phosphorus, then consequently the potential phosphorylio-

**Table 1.** Patient characteristics and deaths in heroin-addicted between 2001 and 2010

Years	Total deaths	Deaths from heroin	Deaths from other causes*	Deaths from cancer	Males N (%)	Females N (%)	Age <20 N (%)	Age 21-30 N (%)	Age >31 N (%)
2001	321	318	3	0	300 (93.50)	21 (6.50)	46 (14.30)	158 (49.20)	117 (36.40)
2002	259	256	3	0	242 (93.40)	17 (6.60)	28 (10.80)	240 (54.10)	91 (35.10)
2003	217	206	11	0	199 (91.70)	18 (8.30)	13 (6.00)	118 (54.40)	86 (39.60)
2004	255	252	3	0	234 (91.80)	21 (8.20)	15 (5.90)	133 (52.10)	107 (42.0)
2005	325	319	6	0	299 (92.0)	26 (8.00)	15 (4.60)	179 (55.10)	131 (40.30)
2006	253	247	6	0	226 (89.30)	27 (10.70)	7 (2.80)	139 (54.90)	107 (42.30)
2007	232	221	11	0	220 (94.60)	12 (5.20)	7 (3)	108 (46.60)	117 (50.40)
2008	196	187	9	0	183 (93.40)	13 (6.60)	8 (4.10)	86 (43.90)	102 (52.0)
2009	196	190	6	0	171 (87.20)	25 (12.80)	6 (3.10)	83 (42.30)	107 (54.60)
2010	140	125	15	0	130 (92.90)	10 (7.10)	5 (3.60)	55 (39.30)	80 (56.40)
Total	2394	2321	73	0	2204 (92.10)	190 (7.90)	150 (6.27)	1299 (54.26)	1044 (43.61)

\*Deaths related to other narcotics (cocaine, etc), hepatitis, liver cirrhosis, car accidents and AIDS (except cancer)

sis is also decreased [8]. Thus the metabolism of phosphorus seems to play an important role either in the initiation or the enhancement of cancer cells in the body.

Elnimr et al. by performing energy-dispersive X-ray fluorescence technique, reported a significant drop at the level of 21% in relation to the period of heroin intake (6 years), compared with healthy subjects, while no significant correlation with gender has been noted [9]. Silveri et al. by using phosphorus magnetic resonance spectroscopy showed that phosphomonoesters were elevated in the days 15-28 after initiating methadone maintenance (MM) treatment, suggesting that the first month of MM treatment may be associated with altered cerebral bioenergetics and phospholipid metabolite levels related to heroin overcome mechanism [10]. However, the exact mechanism of the correlation between serum phosphorus level and heroin addiction is not clear yet. In any case, it seems that the normal values of serum phosphorus related to heroin addiction might have a clinical impact as a potential "barrier" against cancer.

In a recent report from Australia, Degenhardt et al. reported an increased incidence of cancer-related deaths in a cohort of heroin addicted treated for opioid dependence between 1985 and 2005 [11]. However, in our cohort, none of the individuals was treated for heroin dependence, meaning that heroin was constantly keeping the serum levels of phosphorus in normal range and consequently the incidence of cancer was low compared to a previous report [4].

In Greece, 148,712 people died of cancer between 2000 and 2005. Reports from the Greek Statistical Authority (ELSTAT) showed that the main cause of death for ages between 0-29 years were hematological malignancies, while for ages over 30 years the main cause was related to lung cancer. Between 30-59 years, the main cause of death for women was breast cancer, while for men over 75 years the main cause of death were colon and prostate cancer. In Greece, the deaths related to heroin-addiction for ages less than 25 years were almost 38% of the total deaths in these ages. However, there are no evidence-based data concerning a relationship of heroin-addiction and cancer-related death [12].

According to the results of the present study, it seems that heroin is a 'barrier' against cancer, but, by no means is heroin use recommended. Heroin should be considered as a pathway to the treatment of cancer and at the same time as a stimulant to the pharmaceutical industry to try and invent a harmless substance, equivalent to heroin, which might finally prove "protective" against cancer. However, it is rather early to extract safe conclusions from the present study, the findings of which should be confirmed by future similar studies.

## Acknowledgement

We are grateful to the Head of the Greek Reintox Focal Point Mrs M. Tersidou, for her valuable assistance without which it would be impossible to carry out the present study.

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