

# ACQUIRED PREDISPOSITION TO RENAL DAMAGE ASSOCIATED TO TOBACCO CONSUMPTION

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## Background

Tobacco is a risk factor for several diseases such as cardiovascular and respiratory disorders or some tumors. Moreover, a relation between tobacco and renal damage has also been described during the last years. Referring to early diagnosis of renal disease, our group has developed the acquired predisposition concept, which can be applied to the smoking patient context. So, our hypothesis is that tobacco may cause predisposition to acute kidney injury (AKI), which means smokers may suffer AKI after being exposed to any nephrotoxic substance, including under toxicity level doses.

## Objective

To study the relationship between the predisposition biomarkers 1 (BM1), 2 (BM2) and 3 (BM3) (characterized in our laboratory and encrypted for patentability reasons) and tobacco consumption.

## Methods

### Patients and urine samples

Samples were taken from patients from the health centre of Coria in Cáceres, Spain (Figure 1).

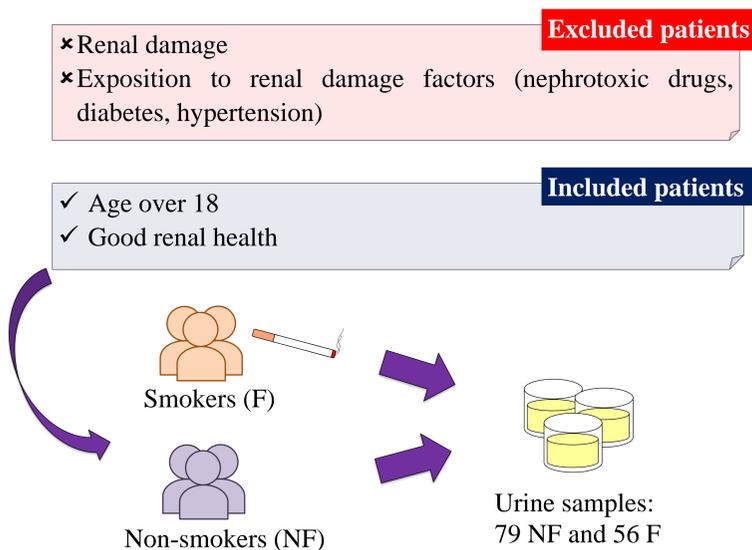


Figure 1. Process of selection and classification of patients and their samples.

### Laboratory tests

Parameters	Test	Information
Serum creatinine	Clinical history	Renal function
Urine creatinine	Jaffé reaction	Urine concentration *
Cotinine	Competitive ELISA	Grade of smoking
BM1, BM2 and BM3	Western blot	Acquired predisposition

Table 1. Description of the laboratory tests done in the studio. \*: Useful for comparing the biomarkers excretion in different urine samples.

## Results

- F and NF characteristics are statistically similar (Table 2).
- BM1 was only detected in one urine sample from the F group (Figure 2).
- The BM2 results (Figure 3) showed that its excretion do not differs between the NF and F groups.
- The BM3 detected (Figure 4) was statistically different in each group, but its quantity was not related with the grade of smoking (figure 5).

	NF	F
Males	37	21
Females	42	35
CrP (mg/dL)	0.81 ± 0.01	0.79 ± 0.02
Age (years)	44 ± 14	42 ± 11
Weight (Kg)	72.81 ± 15.83	68.32 ± 12.63
Height (cm)	168.11 ± 8.77	164.88 ± 7.69
BMI (Kg/m <sup>2</sup> )	25.60 ± 4.41	25.03 ± 3.84

Table 2. Mean of characteristics and their standard derivation. In all cases  $p > 0.05$  in Student's t-distribution. NF: non-smokers, F: smokers; CrP: serum creatinine.

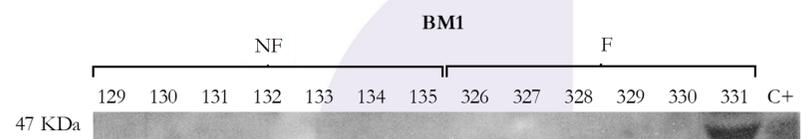


Figure 2. Western blot of the only sample with BM1. NF: non-smokers, F: smokers; C+: positive control. Numbers refer to each urine sample.

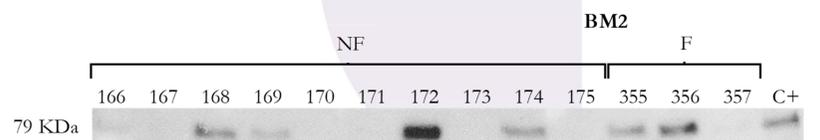


Figure 3. Representative image of western blot analysis of BM2. NF: non-smokers, F: smokers; C+: positive control. Numbers refer to each sample.

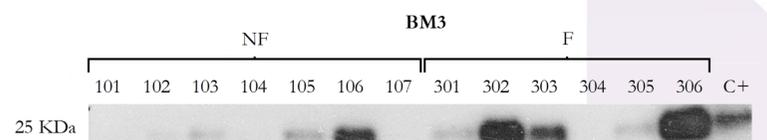


Figure 4. Representative image of western blot analysis of BM3. NF: non-smokers, F: smokers; C+: positive control. Numbers refer to each sample.

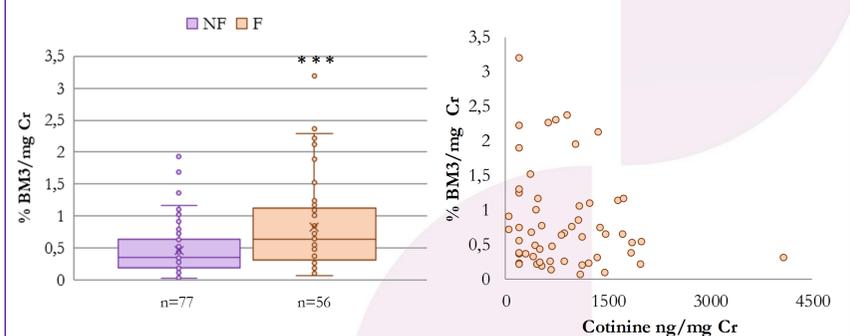


Figure 5. Box-plot graphic of the BM3 analysis in NF and F groups and BM3 excretion versus cotinine excretion graphic. NF: non-smokers; F: smokers; Cr: urinary creatinine; \*\*\*:  $p < 0.001$  in Mann-Whitney U test. Right:  $p > 0.05$  in Pearson correlation test.

## Conclusions

- The BM3 excretion is higher in smokers patients than in non-smokers, but this excretion is not related to cotinine levels.
- BM3 could be a good clinical biomarker of AKI predisposition which would help to prevent renal damage in smokers.