RESULTS

Most important, as Cadmium half-life is as long as 30 years (Leblanc JC, 2006), it is not eliminated spontaneously and accumulates in the prostate with time, which corresponds to an increased PK risk with age. Cadmium vapours, even in the solid state, penetrate insidiously, are odorless and tasteless. Molluscs (mussels, oysters), crustaceans organism. Tobacco contains Cadmium, [but also dioxine TCDD (→ Ha-Ras mutations), nitrosamines (→ Ki-Ras mutations)]. The Hazard Ratio for PK specific mortality is 1.82 if the patient smokes (Kenfield SA, 2011).

Occupational studies show a correlation with the professional work in contact with Cadmium (Kjellstrom T, 1979, in Sweden).

C-Myc oncogen

Cadmium increases the oncogene c-Myc in renal (Tang N, 1991) and RWPE-1 prostatic cells (Achanzar WE, 2000). C-Myc stimulates telomerase promoter (high levels in PK). C-Myc up-regulates the androgen receptor messenger RNA (Grad J, 1999).

Myc confers androgen-independent prostate cancer cell growth (Bernard D, 2003; Kokontis J, 1994).

C-myc transgenic mice develop prostatic intra-epithelial neoplasia (Zhang X, 2000).

Loss Of Heterozygosity (LOH) of Bin-1 (Bridging integrator 1) located at chromosome 2q14, an anti-Myc tumor suppressor is found in 42% of KP, in metastatic tumors and
androgen-independent tumor cell lines (Ge K, 2000; Sakamuro D, 1996; Schmidt EV).
Subjects with Bin-1 LOH are likely to be more vulnerable to Cadmium oncogenicity.

Conclusion

Cadmium is a risk factor in a PK subgroup; 3 high-quality studies of toenail selenium and PK risk indicated a reduction in PK risk (Relative Risk = 0.29) with a toenail selenium concentration 0.85-0.94 μg/g (Hurst R, 2012).

The US Selenium and Vitamin E Cancer Prevention Trial (SELECT) showed that a long term supranutritional supplemental dose of selenomethionine (200 μg/d) in a selenium-replete population did not significantly reduce the risk of developing prostate cancer. However no data on the cadmium level were presented (Lippman SM, 2009).

ALA, thioctic acid) are Cadmium chelators (El-Maraghy SA, 2011). Some soils are rich in Cadmium: in the surrounding area of discharges, gold mines (Orbel valley, where snails have a Cadmium level 30 times the normal value), dams funds (Sauviat); professionally, workers at risk are those of Cadmium-Nickel battery (Sahmoun AE, 2005)
, anti-corrosion coating, plastic paints, luminescent materials, metalworking (INRS toxicological card, 1992)
.

A systematic study of toenail Cadmium levels by graphite-furnace atomic absorption spectrometer is advocated in PK. For this subgroup, Cadmium chelation by Selenium (+ vitamine E) and ALA is logical. Heavy metal detoxification by parsley, coriander, garlic (allium ursinum) may be useful (Willem JP, 2014).

164: 291-300.

Bernard D
et al. Myc confers androgen-independent prostate cancer cell growth.
*J Clin Invest*

Bryś M
et al. Zinc and cadmium analysis in human prostate neoplasms.
*Biol Trace Elem Res*

Ekman P
*Eur Urol*

El-Maraghy SA
, Nassar NN. Modulatory effects of lipoic acid and selenium against cadmium-induced biochemical alterations in testicular steroidogenesis.
*J Biochem Mol Toxicol*

Ge K
et al. Loss of heterozygosity and tumor suppressor activity of Bin1 in prostate carcinoma.
*Int J Cancer*

Goyer RA
, Liu J, Waalkes MP. Cadmium and cancer of prostate and testis.
*Biometals*

Grad JM
et al. Multiple androgen response elements and a Myc consensus site in the androgen receptor (AR) coding region are involved in androgen-mediated up-regulation of AR messenger RNA.
*Mol Endocrinol*

Hurst R
et al. Selenium and prostate cancer: systematic review and meta-analysis.
*Am J Clin Nutr*

Julin B
*Br J Cancer*

Kenfield SA
et al. Smoking and prostate cancer survival and recurrence.
*JAMA*
2011, 305: 2548-55.

Kjellström T
et al. Mortality and cancer morbidity among cadmium-exposed workers.
C.96-PROSTATE CANCER AND CADMIUM: A SILENT INODORE TOXIC PENETRATING BY INHALATION.

Environ Health Perspect
1979, 28:199-204.

Kokontis J
. Increased androgen receptor activity and altered c-myc expression in prostate cancer cells after long term androgen deprivation.
Cancer Res
1994, 54: 1566–73

Leblanc JC

Lippman SM.

Morganti G
et al. [Clinico-statistical and genetic research on neoplasms of the prostate].
Acta Genet Stat Med

Ogunlewe JO
. Osegbe DN. Zinc and cadmium concentrations in indigenous blacks with normal, hypertrophic, and malignant prostate.
Cancer

Sahmoun AE
et al. Cadmium and prostate cancer: a critical epidemiologic analysis.
Cancer Invest

Sakamuro D
et al. BIN1 is a novel MYC-interacting protein with features of a tumour suppressor.
Nat Genet

Sanchez Garcia A
et al. Geochemical prospection of cadmium in a high incidence area of prostate cancer, Sierra de Gata, Salamanca, Spain.
Sci Total Environ

Schmidt EV
. MYC family ties.
Nat Genet
1996, 14: 8-10.

Schöpfer J.
Selenium and cadmium levels and ratios in prostates, livers, and kidneys of nonsmokers and smokers.
Biol Trace Elem Res

Tang N
C.96-PROSTATE CANCER AND CADMIUM: A SILENT INODORE TOXIC PENETRATING BY INHALATION.

, Enger MD. Cadmium induces hypertrophy accompanied by increased myc mRNA accumulation in NRK-49F cells. 
*Cell Biol Toxicol*

Tang N
, Clapper JA, Enger MD. Cd++ inhibits EGF induced DNA synthesis but not EGF induced myc mRNA accumulation in serum starved NRK-49F cells. 
*Cell Biol Toxicol*

Vinceti M
et al. Case-control study of toenail cadmium and prostate cancer risk in Italy. 
*Sci Total Environ*
2007, 373: 77-81.

Waalkes MP
et al. Carcinogenic effects of cadmium in the noble (NBL/Cr) rat: induction of pituitary, testicular, and injection site tumors and intraepithelial proliferative lesions of the dorsolateral prostate. 
*Toxicol Sci*

West DW
et al. Adult dietary intake and prostate cancer risk in Utah: a case-control study with special emphasis on aggressive tumors. 
*Cancer Causes Control*

Willem Jean-Pierre

Yoshizawa K
. Study of prediagnostic selenium level in toenails and the risk of advanced prostate cancer. 
*J Natl Cancer Inst*

Zhang X
et al. Prostatic neoplasia in transgenic mice with prostate-directed overexpression of the c-myc oncprotein. 
*Prostate*
2000, 43: 278-85