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LETTER TO EDITOR

Renal Cell Carcinoma after Chernobyl: on the Role of Radiation vs. Late Detection

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The average individual doses received by six million residents of the contaminated areas after the Chernobyl accident during the whole period 1986–2005 were around 9 mSv [1]. The worldwide annual exposures to the natural background radiation vary widely; they are generally expected to be within the range 1–10 mSv, which is not known to be associated with increase in health risks [2]. The average individual doses from the background radiation for some countries are listed in [3]. This matter should have been elucidated in the studies where patients from different countries were compared [4–8]; otherwise individual doses in the exposed cohort can be not significantly different from those in the control group. Besides, a comparison with the controls from West Europe should also have included dose estimates from diagnostic radiology: a computed tomographic (CT) examination causes an effective dose 2–20 mSv [9]. These dose comparisons show that the term "chronic, long-term, low doses of ionizing radiation", used e.g. in [4–8] is not generally applicable to the residents of contaminated areas after the Chernobyl accident.

The statement: "During the 25-year period subsequent to the Chernobyl accident, the morbidity of malignant renal tumors in Ukraine has increased from 4.7 to 10.7 per 100,000 of the total population" [4] was supported by a reference to a report by the Ministry of Health of Ukraine. However, at present, there appears to be no hard evidence of any measurable increased incidence of all solid cancers taken together among the populations of Russian Federation and Ukraine; while substantial increase occurred since the Chernobyl accident in thyroid cancer in people exposed as children as adolescents [1]. Incidence increase of renal cell carcinoma (RCC) as a consequence of the Chernobyl accident has never been demonstrated; the increase mentioned in [4] could have been caused by improved diagnostics. The statement "Recent studies of our group have shown that increases in morbidity, aggressiveness, and proliferative activity of RCCs, especially clear-cell RCC, in Ukrainian patients that have continuously inhabited the radio-contaminated areas, might be explained by specific molecular events, influenced by chronic persistent low-dose ionizing radiation exposure" [4] was supported by self-references e.g. to [6, 7], where the following was stated: "The strong significant differences between the Ukrainian and Spanish groups were found in tumoral nuclear grade" [6] and "Our data showed in the majority of Ukrainian patients a radiation sclerosing proliferative atypical nephropathy in association with an increase in the incidences of tubular epithelial nuclear atypia and carcinoma in situ" [7]. In the article (4) it is stated that 73 % percent of group 3 (patients from contaminated areas) and 72 % of group 2 (from the clean areas of Ukraine) the RCC displayed the highest microvessel density; whereas the ratio of the average total vessels and capillaries in the Ukrainian groups combined was 1.65:1 in comparison to the Spanish group [4]. It means that the differences between RCC (including peritumoral renal tissue) from Ukraine and Spain were repeatedly found. It is concluded in [4] that the radiation exposure increases microvessel density in RCC is associated with a higher histological grade. The difference in the histological grade can be explained by the on average earlier detection of malignancies in Spain.

An association of microvessel density with the grade of RCC, reported in [10], appears to be probable because of general considerations: "To further increase in size, tumor cells express molecules that initiate tumor vascularization" [4]. Accordingly, the higher microvessel density in RCC from Ukraine compared to RCC from Spain, as well as the increase in 'aggressiveness' of cancers after the Chernobyl accident in general, was probably caused by detection in the

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former Soviet Union of old neglected cancers, sometimes misinterpreted as radiogenic tumors developing after a short latency. Morphologic and molecular-genetic differences between RCC from Ukraine and Spain [4–7] were probably caused by differences in the average tumor grade: cancers from Ukraine were on average more advanced and accordingly less differentiated than those from Spain, commented in [11].

In conclusion, results of some studies about Chernobyl should be re-evaluated [12], considering that some tumors detected after the accident due to the screening and improved diagnostics, or brought from non-contaminated areas, were relatively advanced. It can be confirmed by the following citation: "The tumors were randomly selected (successive cases) from the laboratories of Kiev and Valencia… [The cancers were] clearly more aggressive in the Ukrainian population in comparison with the Valencian cases" [13]. It has an explanation: earlier detection of malignancies in Valencia. For example, results of the study (8) might appear inconclusive: "These findings do not allow us to consider the immunohistochemical expression of ubiquitylation and sumoylation as valuable markers for discriminating the effects of long-term, low-dose IR exposure in cRCC (conventional renal cell carcinoma) carcinogenesis." [8] Considering that the cancers diagnosed in Ukraine were on average more advanced than the controls from Spain, the results of this study suggest that ubiquitylation and sumoylation are not associated with the neoplastic progression of RCC. On the contrary, an association with tumor de-differentiation can exist for some markers of RCC, where significant differences between the Ukrainian and Spanish cohorts were found [4–6].

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