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Prostate-Specific Antigen or Human Kallikrein 3?

Recent Developments

In his recent review, Chu [1] described elegantly the discovery of prostate-specific antigen (PSA), its evolution and establishment as the premier tumor marker of prostatic adenocarcinoma and its application for prostate cancer management and screening. The paper is a significant review covering the period from 1979 until today. Notably, however, none of the new, exciting discoveries related to non-prostatic PSA have been mentioned. In order to supplement the previous review, I summarize, in table 1, some recent discoveries in the PSA field. It is now very clear that the name of this molecule does not represent the current knowledge and it is misleading. It would be appropriate from now on PSA is called 'human kallikrein 3' in accordance with the new nomenclature [2]. The inappropriateness of the current name is demonstrated by a comparison of PSA concentrations in serum of normal males (up to 4 μg/l) and in nipple aspirate fluid from female breast (up to 1,000 μg/l) or breast milk from lactating women (up to 100 μg/l). It is evident from the current literature that the applications of PSA in non-prostatic diseases are expanding and are supplementing, not replacing, its traditional use [3–7]. Importantly, despite new advances, the diagnostic value of PSA in prostatic disease has never been questioned.

It is hoped that the new insights into PSA biochemistry, biology and pathophysiology will help to identify the biological functions of PSA in the female breast and other non-prostatic tissues.

Table 1. Human kallikrein 3 (PSA): new knowledge and applications

Finding/References
Discovery of PSA in breast tumors, normal breast tissue and hyperplastic breast tissue [8–15]
Production of PSA by breast cancer cell lines, induced by androgens and progestins [16, 17]
Presence of PSA in milk of lactating women and breast cyst fluid [18–20]
Presence of PSA in amniotic fluid; possible association with fetal abnormalities [21–23]
PSA presence in various tumors [24–26]
PSA in serum of women/possible use for disease diagnosis with PSA subfractions [27–33]
PSA as a prognostic indicator in breast cancer [34]
PSA in ovarian/lung cancer [35–39]
PSA in nipple aspirate fluid; breast cancer risk assessment [40, 41]
Serum PSA as a marker of androgen excess in women [42]
Mutations of the promoter region of the PSA gene in breast cancer [43]

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Comment

The author of this paper is principally right, human kallikrein 3 is a 'biologically' correct term for PSA. However, in practice, we will have (and want) to live with PSA. When comparing the organ specificity of PSA with other organspecific markers, e.g. chorionic gonadotropin, the situation is very similar. Human chorionic gonadotropin is for most practical purposes organ specific, but when looking closely it is also produced by the pituitary gland and many tumors. This does not mean that we must term it differently. This is just one example, carcinoembryonic antigen is another. There were numerous attempts to change the name of this antigen, because strictu senso it is incorrect. But we continuously learn that proteins with a well-known function and localization may also occur in other organs and tissues and may exert other functions.

Nevertheless, human kallikrein 3 should, indeed, be mentioned as an alternative name of PSA, especially in reviews, but PSA is certainly appropriate in papers concerning the use of this marker in prostatic disease. The use of this name in the review by Dr. Chu was justified on the basis that he introduced this name and described the use of PSA as a marker for prostate cancer. The review, as indicated, was the text of his Abbott Award lecture and was intended to especially concern his contribution to the field, which may explain why Dr. Diamandis' very interesting studies were not mentioned.