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Synthesis of Steroid Derivatives for In Vitro Diagnostics

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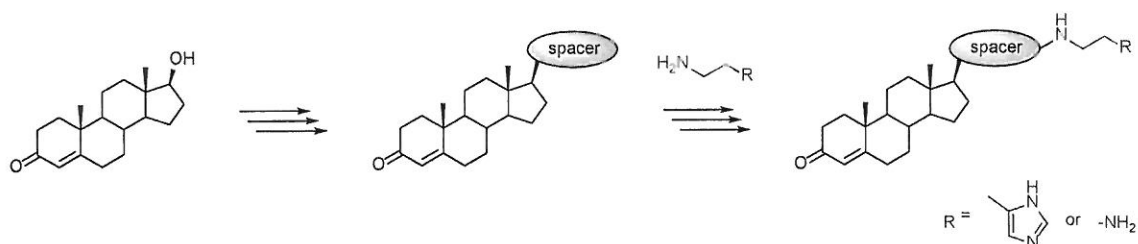
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The determination of free steroid hormone levels (e.g. testosterone or progesterone) is very important in the diagnosis of a wide variety of diseases. For example, elevated levels of testosterone can occur in testicular or adrenal tumours, ovarian and adrenal neoplasia, congenital adrenal hyperplasia, polycystic ovary syndrome, and female hirsutism. On the contrary, decreased levels might cause hypogonadism, insufficient testicular descent or ovarian failure [1].

Both methods ELISA (Enzyme-Linked Immunosorbent Assay) and RIA (RadioImmunoAssay) have been using for determining serum hormone concentrations in medicine. RIA is based mostly on radioiodinated steroids, therefore these compounds must be attached to moieties, which can be easily iodinated (e.g. imidazole or phenol). On the other hand, ELISA applicable compounds must contain functional group, which can be easily attached to various enzymes (i.e. primary amine or carboxylic acid).

This work is focused on the synthesis of novel steroidal androgen derivatives consisting of a steroidal skeleton, a spacer and imidazole ring or a primary amine functional group. The starting material for the synthesis is represented by commercial available hydroxy-androgens, which are further modified [2]. First, the hydroxyl group is attached to the spacer and then connected to the desired imidazole or the protected primary amine (Scheme 1) [3,4]. The above described derivatives will be utilized for development of analytical kits for a determination of the free steroid hormone.

Scheme 1



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1 Bender, V. D.; Botham, K. M.; Kennell, P. J.; Weil, P. A. in *Harper's Illustrated Biochemistry* 31/e, McGraw-Hil Education, 2018

2 Geoffroy, P.; Ressault, B.; Marchioni, E.; Miesch, M. *Steroids* 2011, 76, 702.

3 White, A.; Smith, G. N.; Crosby, S. R.; Ratcliffe, W. A. J. *Steroid Biochemistry* 1985, 23, 981.

4 Pouzar, V.; Černý, I. *Collect. Czech. Commun.* 1994, 59, 2042