Letter to the Editor

Louise Guillaume, Virginie Chapelle, Carmen Minea and Damien Gruson*

Testing for anti-Müllerian hormone: analytical performances and usability of a point-of-care assay

https://doi.org/10.1515/cclm-2022-0069
Received November 14, 2021; accepted February 26, 2022; published online March 23, 2022

Keywords: anti-Müllerian hormone (AMH); biomarker; infertility; ovarian; point-of-care.

To the Editor,

Anti-Müllerian hormone (AMH), also known as Müllerian inhibitory substance (MIS), is a dimeric glycoprotein belonging to the transforming growth factor beta (TGF-β) superfamily [1, 2]. In men, this protein produced by fetal Sertoli cells, plays an essential role in sexual differentiation by inducing regression of the Müllerian ducts. In contrast, in women, the absence of AMH leads to the development of the Müllerian ducts to form the uterus, the fallopian tubes, and the upper part of the vagina. From the 32nd week of gestation, AMH is produced and secreted by the ovarian granulosa cells. Its level is almost undetectable at birth and gradually increases to reach a peak at the age of 24.5 years [1, 3]. The AMH concentration then decreases throughout the reproductive life to become undetectable after menopause due to the reduction of the ovarian follicle pool and the quality of the oocytes [1, 2].

Measurement of AMH circulating levels is clinically relevant in different conditions. In men, especially in prepubertal boys, AMH is appropriate to differentiate cryptorchidism from anorchism as well as to distinguish dysgenetic causes of disorders of sexual development from those due to defective androgen synthesis or action [4]. In women, AMH is used to assess ovarian reserve. AMH testing could be used to predict the onset of menopause since the AMH level becomes undetectable 3–5 years before the final disappearance of ovulation and menstruation [3]. Moreover, the evidence of AMH as a biomarker for the diagnosis of both in polycystic ovary syndrome (POCS) and granulosa cell tumors (GCT), where its serum concentration increases, is raising [2, 3]. Finally, this glycoprotein is an essential marker in assisted conception, especially as an increasing number of women over 30 years old consult for infertility problems [5]. AMH is considered as an ideal marker to establish the individualized ovarian stimulation regimen and gonadotropin dosage in *in vitro* fertilization (IVF) treatment programs [6]. Bicentric study conducted by Nelson et al. confirmed that it is possible to individualize the ovarian stimulation regime based exclusively on the serum AMH concentration [7]. Thus, this marker can be very useful to decrease the risk of hyporesponse and ovarian hyperstimulation syndrome. It can also be used to optimize the number of oocytes collected and pregnancy rates by choosing the type of stimulation protocol in IVF and to adjust the gonadotropin dose [8].

Several methods have been developed to measure AMH circulating concentrations. Different assay formats are now available and based on enzyme linked immunosorbent assay (ELISA) or fully automated immunoassays [7]. For these methods, the turn-around time of analysis varies from 1 h to several hours. Over the past two decades, the use of point-of-care testing (POCT) methods have expanded considerably [9]. Implementation of POCT solution for AMH testing has the potential to accelerate the clinical decision process and adapt treatment in consultation or IVF settings.

Louise Guillaume and Virginie Chapelle contributed equally to this work.

***Corresponding author: Prof. Damien Gruson**, Department of Clinical Biochemistry, Cliniques Universitaires St-Luc, Université Catholique de Louvain, 10 Avenue Hippocrate, 1200 Brussels, Belgium; and Pôle de recherche en Endocrinologie, Diabète et Nutrition, Institut de Recherche Expérimentale et Clinique, Cliniques Universitaires St-Luc, Université Catholique de Louvain, Brussels, Belgium, Phone: +32 (0)2 7646747, Fax: +32 (0)2 7646930, E-mail: damien.gruson@uclouvain.be

Louise Guillaume and Virginie Chapelle, Department of Clinical Biochemistry, Cliniques Universitaires St-Luc, Université Catholique de Louvain, Brussels, Belgium. https://orcid.org/0000-0002-8416-8956 (L. Guillaume)

Carmen Minea, Department of Clinical Biochemistry, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain