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Serum IRAP, a novel direct biomarker of insulin-resistance as a screening, diagnostic and drug discovery tool

Insulin resistance (IR) affects more than half of the adult population worldwide. Type 2 diabetes (T2D), which often follows in the absence of treatment, affects more than 400 million people and represents more than 10 % of the health budget in industrialized countries. A preventive public health policy is urgently needed to stop this constantly progressing epidemic. Indeed, early management of IR does not only strongly reduce its evolution towards T2D but also strongly reduces the appearance of cardiovascular comorbidity as well as that of associated cancers. There is however currently no simple and reliable test available for the diagnosis or screening of IR. We therefore developed an ELISA for the quantitative determination of a novel circulating biomarker of IR, IRAP. IRAP is associated with and translocated in a stoechiometric fashion together with GLUT4 to the plasma membrane in response to insulin in skeletal muscle and adipose tissue. Its extracellular domain is subsequently cleaved and secreted in the blood stream. In T2D, IRAP translocation in response to insulin is strongly decreased. Our patented sandwich ELISA is highly sensitive and specific, robust and very cost effective. Results of pilot studies indicate an excellent correlation between serum IRAP levels and insulin sensitivity. We therefore believe that serum IRAP is a direct marker of insulin sensitivity and that the quantitative determination of its plasma levels should allow large scale screening of populations at risk for IR and T2D, thereby allowing the enforcement of a preventive health policy aiming at reducing this epidemic. Similarly, simple companion tests allowing the assessment of the efficacy of novel drugs aimed at improving insulin sensitivity do not exist yet. As such serum IRAP appears as a useful alternative to the euglycemic hyperinsulinic clamp which is very tedious, expensive and requires experienced teams, to monitor insulin sensitivity in human in clinical trials and therapeutic trials.

Speaker Biography

Serge P Bottari obtained his MD and PhD at the Free University Brussels, Belgium. He specialized in OB/GYN and Biochemistry and was a post-doctoral fellow and research associate at UC San Francisco. After having been a project leader at Sandoz and CIBA Geigy in Basel (Switzerland), he became professor of cell biology at the Medical School in Grenoble and head of endocrine biology in 1993. His articles in premium journals have been cited over 4000 times and he is a member of several editorial boards. He also holds several patents. His h-index is 31. His current work focuses among others on the molecular mechanisms involved in insulin resistance and on the development of novel diagnostic tools.

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