Electronic tongue:

It was scientifically understood that there are five different tastes: sweet, sour, salty, bitter and umami and all other tastes are basically combination of these five. So the electronic tongue should ideally be an array of sensors for at least these five different tastes.

Sweet taste can be characterized by sugar and can be detected by a multienzyme (like glucose oxidase, amylase, and cellulose) biosensor. Sour and salty tastes can be corresponded to HCl, citric acid, lactic acid, NaCl and other salts. It can be detected by using a high precision pH sensor. Bitter taste- It can be detected by an immune sensor which can detect the presence of bitter compounds like caffeine or quinine or also by using a metal electrode sensor. Umami can be detected by using amino acid sensors.

Research article show that all the tastes can be detected by using sensors made from different lipid membranes and measured using potentiometry and voltametry.

1)Kiyoshi Toko, Taste sensor, Sensors and Actuators B: Chemical, Volume 64, Issues 1-3, 10 June 2000, Pages 205-215, ISSN 0925-4005.

2)Yu. G. Vlasov, A. V. Legin, A. M. Rudnitskaya, A. D'Amico, C. Di Natale, <<Electronic tongue>> -- new analytical tool for liquid analysis on the basis of non-specific sensors and methods of pattern recognition, Sensors and Actuators B: Chemical, Volume 65, Issues 1-3, 30 June 2000, Pages 235-236, ISSN 0925-4005.

3) Yu. G. Vlasov, A. V. Legin, A. M. Rudnitskaya, A. D'Amico, C. Di Natale, <<Electronic tongue>> -- new analytical tool for liquid analysis on the basis of non-specific sensors and methods of pattern recognition, Sensors and Actuators B: Chemical, Volume 65, Issues 1-3, 30 June 2000, Pages 235-236, ISSN 0925-4005.

In-vivo biosensors:

There is not much of commercial outcome about in-vivo biosensors seen in the market, however there are wide variety of them developed. Some of them are drug biosensors, glucose biosensors and alkaline ions.

Though none of the biosensors were really tried in humans for long period, under in vivo conditions, the sensors lasted for about 3 to 4 months. After that the sensors developed a problem with the membrane or issues with enzyme activity or mineralization.

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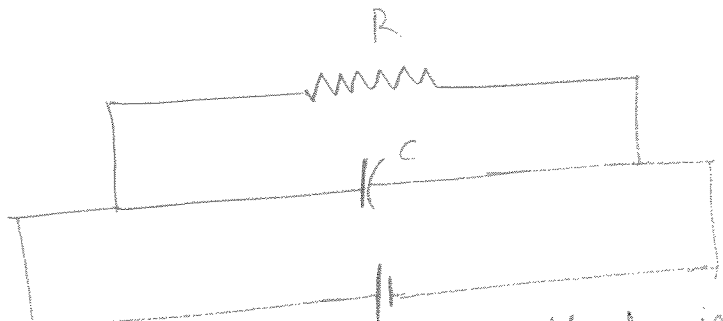
George S. Wilson, Raeann Gifford, Biosensors for real-time in vivo measurements, Biosensors and Bioelectronics, Volume 20, Issue 12, 20th Anniversary of Biosensors and Bioelectronics, 15 June 2005, Pages 2388-2403, ISSN 0956-5663.

Reversibility of a biosensor:

The more selective a biosensor is, the stronger would be its binding with the substrate. Thus highly specific biosensors are totally irreversible and the sensor loses its activity after sometime. If it is to compare enzyme and immune biosensors, immune biosensors are irreversible at any cost. However enzyme based biosensors can be slightly reversible due to quasi-reversibility or equilibrium changes. 10

The equivalent electrical circuit of a metal/electrolyte interfaces with the electrode at a potential so that a redox reaction occurs:



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This is an RC type circuit that is at the metal/electrolyte interface. The electrolyte can be the capacitance type element & the metal interface can serve as the resistance.