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AC and DC Coupling for Biopotential Amplification[1] MARY FOX, SARAH EVANS, ARTHUR SWEENEY, JACOB MOLDENHAUER, DREW STENESEN, University of Dallas — Different electrophysiological studies require the retention of different information from the detector being used. For example, electrocardiogram (EKG) tests only require that the voltage amplitude and frequency of heart beats be recorded, and therefore use alternating current (AC) coupled amplifiers, as these signals represent AC signals such as sine waves. Electroretinograms (ERG) demand that the duration of stimulation of photoreceptors in the retina be retained, resulting in the need for a direct current (DC) coupled amplifier to detect sustained potential. AC and DC amplifiers were compared for their ability to make useful ERG measurements. The following amplifiers were tested: Vernier EKG detector, OpenBCI Ganglion, and Warner Instruments Intracellular Electrometer. They were tested on live fruit fly, Drosophila melanogaster, whose photoreceptors in the retina were excited by a flashing LED at constant frequency. The methods for testing these devices are described and the results of the tests are discussed. The Vernier EKG Detector was shown to be the least useful in the detection of Drosophila ERGs as it uses a strictly AC coupled amplifier, while the OpenBCI Ganglion was shown to make good quality ERG detections at specific frequencies. The Warner Electrometer, the standard in biology circles, proved to be the best instrument for the job, showing useable ERGs more consistently than the Ganglion.

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