

# This Week's Citation Classic

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**Scherlag B J, Lau S H, Helfant R H, Berkowitz W D, Stein E & Damato A N.** Catheter technique for recording His bundle activity in man. *Circulation* 39:13-8, 1969. [Cardiopulmonary Lab., US Public Health Service Hosp., Staten Island, NY]

**A clinical technique is described for recording electrical activity from a specialized conducting fascicle, the His bundle, within the heart. The His bundle electrogram allows a more accurate determination of the site and degree of conduction delay or heart block than the electrocardiogram alone. [The SC]<sup>®</sup> indicates that this paper has been cited over 720 times since 1969.]**

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"Hoffman and his associates in the early 1960s published an excellent series of studies in which recordings were made from the His bundle and bundle branches of the dog heart after cardiomy and cardiopulmonary bypass.<sup>12</sup> In 1965, as Hoffman's postdoctoral student, I was involved in a project requiring the surgical induction of complete heart block in the experimental animal. In the anesthetized dog subjected to thoracotomy, I was able to locally inject the area of the His bundle with formaldehyde to induce complete heart block without cardiomy or cardiopulmonary bypass. When I arrived at my first 'real' job at the Staten Island US Public Health Service Hospital in 1965, I realized my injection technique to destroy the His bundle could be used just as easily to record its electrical activity. By threading two Teflon-coated stainless steel wires into a hypodermic needle, the wires could be 'injected' into the His bundle region to record bipolar electrograms. Also, selective electrical pacing

from the His bundle could be achieved through the same wires.<sup>3</sup>

"The next objective was to record and electrically pace from the His bundle without thoracotomy. John Lister, a colleague, had written a grant proposal before leaving Staten Island for Miami. In it he proposed to map the right heart using an electrode catheter with as many as six bipolar pairs on it. With the objective of recording electrical activity from the His bundle, Richard Helfant and I developed a technique by which a standard bipolar pacing catheter (2 electrode rings 1 cm apart) was passed via a femoral vein into the right heart of the dog. By monitoring the electrical activity we were able to position the electrode tip in apposition to the His bundle and record its electrical activation during the P-R segment of the simultaneously recorded electrocardiogram. Within a short time Sun Lau and I used the same technique to record His bundle activity in patients undergoing right heart catheterization.

"It took approximately two years for the technique established in the experimental laboratory to reach fruition as a clinical procedure. Electrocardiography at this time had become the purview of fewer and fewer academicians. With the development of techniques to record transmembrane potentials from cardiac muscle cells, cardiac electrophysiology tended to polarize into basic and clinical compartments. The popularization of the His bundle recording technique became the basis for a new field called clinical electrophysiology which quickly attracted many young investigators. The insights gained from intracardiac recordings made in the cardiac catheterization laboratory served to bridge the gap between experimental studies done on the whole animal and in isolated tissues and clinical electrocardiography."

1. Hoffman B F, Cranefield P F, Stuckey J H & Bagdonas A A. Electrical activity during the P-R interval. *Circ. Res.* 8:1200-11, 1960.
2. Hoffman B F, Amer N S, Stuckey J H, Cappelletti A & Domingo R T. Activation of the interventricular septal myocardium studied during cardiopulmonary bypass. *Amer. Heart J.* 59:224-37, 1960.
3. Scherlag B J, Helfant R H & Damato A N. A catheterization technique for His bundle stimulation and recording in the intact dog. *J. Appl. Physiol.* 25:425-8, 1968.