

Direct Smartphone Exposure Triggers Rapid Red Blood Cell Aggregation

Ultrasound imaging reveals potential cardiovascular risks from prolonged smartphone contact with the body.

By [Nicolas Hulscher](#)

Theme: [Science and Medicine](#)

Global Research, April 02, 2025

[Focal Points](#)

The study titled, [Hypothesis: ultrasonography can document dynamic in vivo rouleaux formation due to mobile phone exposure](#), was recently published in *Frontiers in Cardiovascular Medicine*:

Carrying a cellphone against the body has become commonplace in our world replete with smartphones. Acute and chronic health effects caused by these devices emitting radiofrequency radiation from multiple antennas have not been well evaluated.

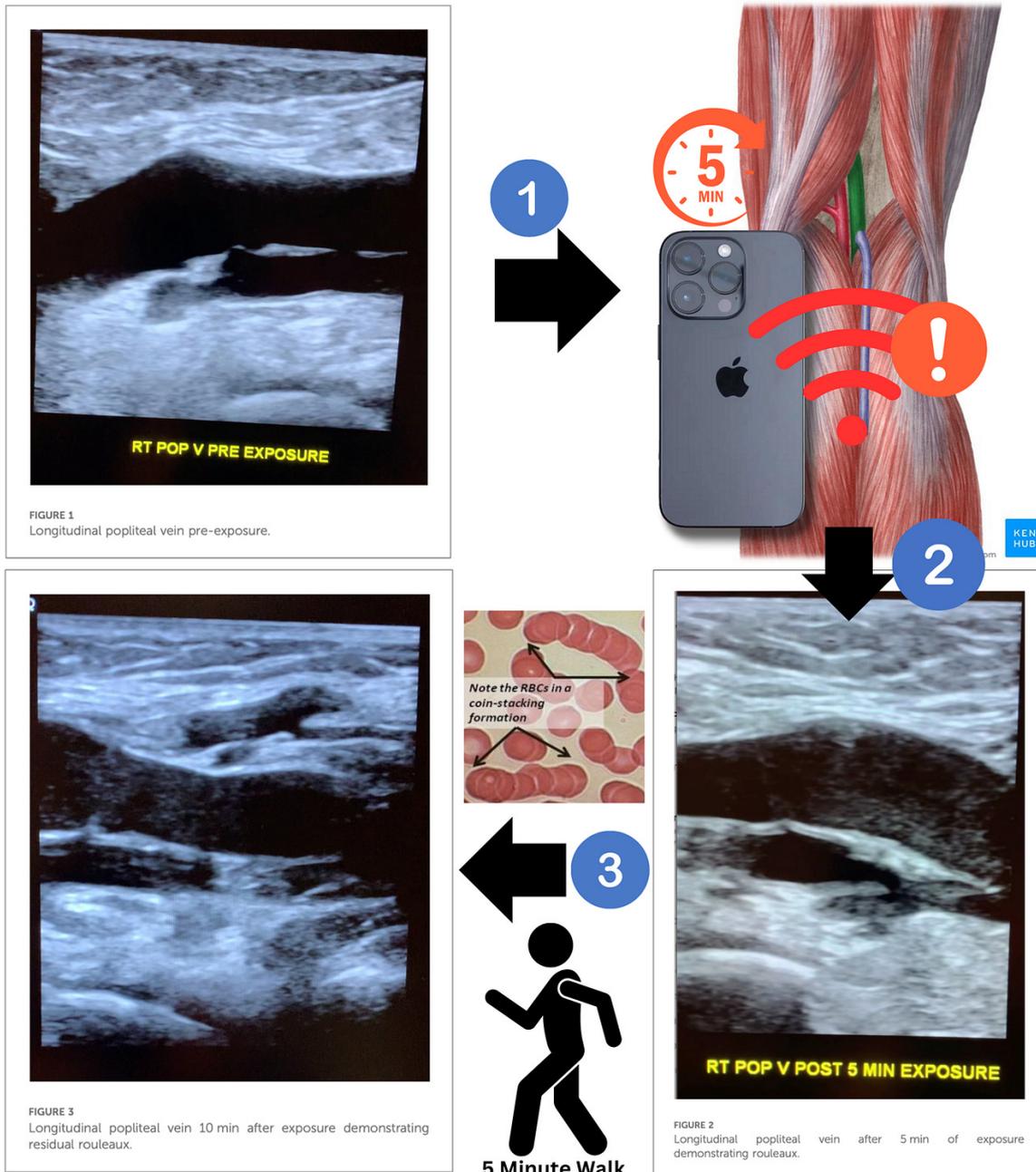
In this study, the popliteal vein of a healthy volunteer was imaged with ultrasonography prior to and following the placement of an idle, but active smartphone against her knee for 5 min [Apple iPhone XR smartphone operating on the AT&T mobile network—Wi-Fi, Bluetooth, and cellular data antennas were all turned on, but the phone was otherwise inactive and idle.].

Pre-exposure longitudinal sonographic images demonstrate a normal anechoic lumen to the popliteal vein. **Images obtained 5 min after direct skin exposure to the smartphone demonstrate a dramatic change in the acoustic appearance of the vessel. The interior of the vessel became coarsely hypoechoic with sluggish flow seen in real-time images, a typical sonographic appearance for rouleaux formation.** A follow up examination performed 5 min after the subject walked around yielded continued rouleaux formation in the popliteal vein, albeit less dramatic than that observed immediately post exposure. This revolutionary *in vivo* method to assess radiofrequency radiation induced rouleaux formation should be further pursued in the general population to determine its prevalence and if its occurrence provides a unique biomarker of exposure that may predict morbidity.

To illustrate this study in an easy-to-understand diagram, I created the following graphic:

Hypothesis: ultrasonography can document dynamic *in vivo* rouleaux formation due to mobile phone exposure

Robert R. Brown^{1,2,3*} and Barbara Biebrich⁴

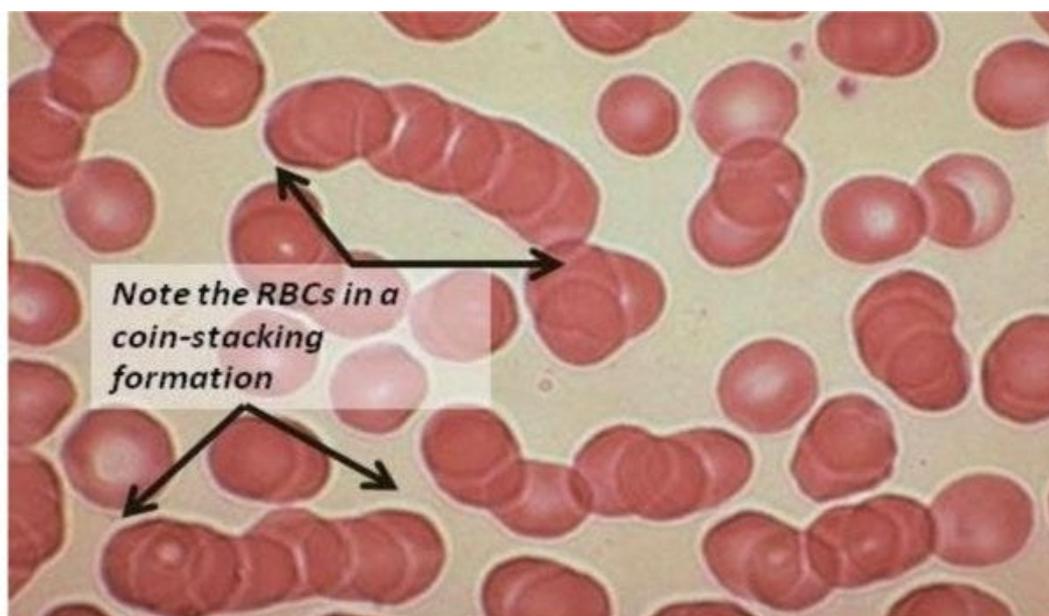


[Click here for an enlarged view](#)

This study raises serious safety concerns about prolonged, direct exposure to smartphones. As the authors note:

Because tissue perfusion is inversely proportional to blood viscosity, the potential development of rouleaux formation from cellphone exposure is of great concern. Rouleaux formation creates a hypercoagulable state, and may impair oxygen delivery,

contributing to tissue ischemia. If the red blood cell aggregation response is indeed systemic, it may have wide reaching multi-systemic effects, including the development or exacerbation of hypertension (10). Morbidity is determined by the patient's underlying health status. Ischemic heart disease, diabetes, prethrombotic states, cancer, peripheral vascular disease, retinopathy, and cerebrovascular insufficiency are among the risk factors that will increase the morbidity associated with the development of rouleaux (11). Although rouleaux is a transient phenomenon, the frequent use of cellphones throughout the day, and potentially other technology commonly found in today's society, may repetitively increase blood viscosity and contribute to micro-occlusions, micro-infarctions, and micro-gangrene. Excessive aggregation of erythrocytes can increase one's susceptibility to develop acute infections, myocardial infarction, and increase one's the risk for deep venous thrombosis (12).



Coin Stacking of Red Blood Cells - Rouleaux Formation

It's entirely possible that this phenomenon could also occur in other areas of the body—particularly when a phone is kept in a pants pocket for extended periods or held next to the head during a call.

Urgent further investigation is needed to replicate these findings with larger sample sizes and to assess their relevance to other areas of the body. If you are at high risk for cardiovascular events, it may be wise to avoid direct, prolonged contact with your smartphone until these concerns are thoroughly evaluated.

All potential biological harms from smartphones and their emitted EMFs should have been thoroughly studied decades ago—*before* mass deployment. Unfortunately, the current trend in the cellular industry reflects a dangerous assumption: "[Assumed Safe, Not Proven Safe.](#)"

*

Click the share button below to email/forward this article. Follow us on [Instagram](#) and [X](#) and subscribe to our [Telegram Channel](#). Feel free to repost Global Research articles with proper attribution.

[Nicolas Hulscher, MPH](#), *Epidemiologist and Foundation Administrator, McCullough Foundation*

Featured image is from iStock

Global Research is a reader-funded media. We do not accept any funding from corporations or governments. Help us stay afloat. Click the image below to make a one-time or recurring donation.



The original source of this article is [Focal Points](#)
Copyright © [Nicolas Hulscher](#), [Focal Points](#), 2025

[Comment on Global Research Articles on our Facebook page](#)

[Become a Member of Global Research](#)

Articles by: **[Nicolas Hulscher](#)**

Disclaimer: The contents of this article are of sole responsibility of the author(s). The Centre for Research on Globalization will not be responsible for any inaccurate or incorrect statement in this article. The Centre of Research on Globalization grants permission to cross-post Global Research articles on community internet sites as long the source and copyright are acknowledged together with a hyperlink to the original Global Research article. For publication of Global Research articles in print or other forms including commercial internet sites, contact: publications@globalresearch.ca
www.globalresearch.ca contains copyrighted material the use of which has not always been specifically authorized by the copyright owner. We are making such material available to our readers under the provisions of "fair use" in an effort to advance a better understanding of political, economic and social issues. The material on this site is distributed without profit to those who have expressed a prior interest in receiving it for research and educational purposes. If you wish to use copyrighted material for purposes other than "fair use" you must request permission from the copyright owner.

For media inquiries: publications@globalresearch.ca