UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 6-K

REPORT OF FOREIGN PRIVATE ISSUER PURSUANT TO RULE 13a-16 OR 15d-16 UNDER THE SECURITIES EXCHANGE ACT OF 1934

For the month of September, 2022.

Commission File Number: 001-40530

GH Research PLC

(Exact name of registrant as specified in its charter)

28 Baggot Street Lower
Dublin 2
D02 NX43
Ireland
(Address of principal executive office)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F:

Form 20-F ☒ Form 40-F ☐

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1): ☐

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7): ☐

On September 22, 2022, at the Interdisciplinary Conference on Psychedelic Research 2022, an investigator will present data related to a Phase 1/2 clinical trial of GH001 (GH001-TRD-102) conducted by GH Research PLC (the "Company"). A copy of the presentation is attached hereto as Exhibit 99.1.

Additionally, on September 23, 2022, an investigator will present data at a poster session related to a Phase 1 clinical trial of GH001 (GH001-HV-101) conducted by the Company. A copy of the poster is attached hereto as Exhibit 99.2.

The fact that these materials are being made available and furnished herewith should not be deemed an admission as to the materiality of any information contained in the materials. The information contained in these materials is being provided as of September 21, 2022 and the Company does not undertake any obligation to update these materials in the future or to update forward-looking statements to reflect subsequent actual results.

EXHIBIT INDEX

Exhibit No.	Description
99.1	Presentation for September 2022
99.2	Poster for September 2022

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: September 21, 2022

GH Research PLC

By: /s/ Julie Ryan
Name: Julie Ryan
Title: Vice President, Finance

A Phase 1/2 Trial of GH001, a Vaporized 5-Methoxy-N,N-Dimethyltryptamine Formulation, in Patients with Treatment-Resistant Depression (TRD)

Johannes Reckweg[1], Cees van Leeuwen[1], Cécile Henquet[2], Thérèse van Amelsvoort[2], Natasha Mason[1], Riccardo Paci[1], Theis Terwey[3], Johannes G Ramaekers[1]

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Clinicaltrials.gov ID NCT04698603

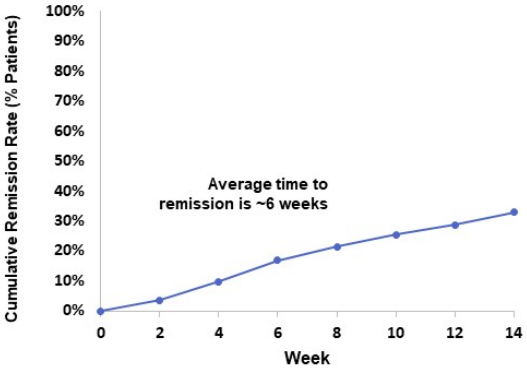
Disclosures

Grants	The study was funded by GH Research
Advisory Board/Consultant	Johannes Reckweg and Jan Ramaekers work as consultants for GH Research

The Problem for Patients with Depression

Established Therapies are Slow-Acting

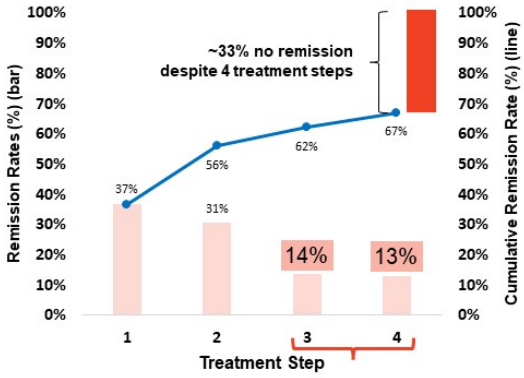
(STAR*D study, Remission Rate Over Time, Treatment Step 1 = Citalopram)



Adapted from Trivedi et al., Am J Psychiatry 2006 and Rush et al., Am J Psychiatry 2006

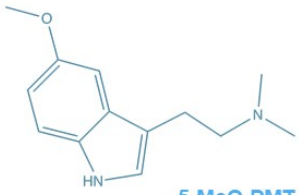
... Remission Rates in TRD < 15%

(STAR*D study, Remission Rates Treatment Steps 1 to 4)



2 or more prior therapies = TRD

5-MeO-DMT and GH001



5-MeO-DMT

- **5-MeO-DMT** (5-Methoxy-N,N-Dimethyltryptamine)
  - Naturally-occurring psychoactive substance from tryptamine class
  - **Highly potent** agonist on 5-HT1A and 5-HT2A receptors
  - **Psychoactive effects with ultra-rapid onset** (within seconds) **and short duration** (5 to 30 min)

- **GH001** (5-MeO-DMT administration via a proprietary inhalation approach)
  - **Intraday individualized dosing regimen (IDR) for maximization of ultra-rapid remissions**
  - **Single visit initial treatment,** with no structured psychotherapy

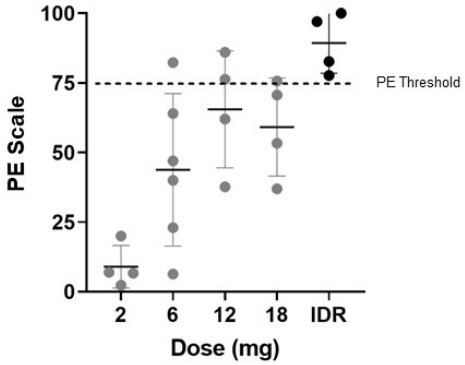
5-MeO-DMT and Peak Experiences

- High propensity to induce **peak experiences (PE)**
  - Feelings of **ego dissolution**
  - Experience of **unity** or **oneness**
  - **Profound** and **meaningful**
- May be a surrogate marker for therapeutic effects

- Assessed through proprietary Peak Experience Scale
  - Three visual analogue scales (0 – 100):
    - Intensity
    - Loss of control
    - Profoundness
  - PE defined as total average of ≥ 75

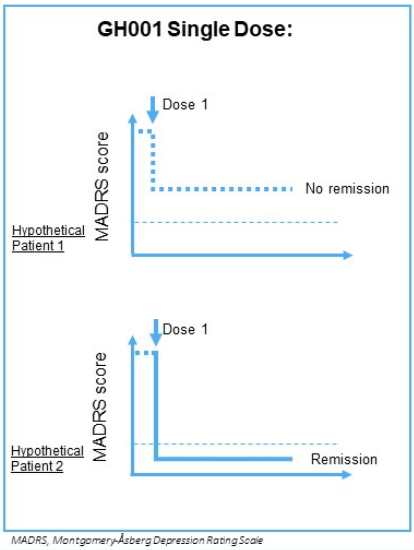
Phase 1 Trial in Healthy Volunteers (GH001-HV-101, n=22)

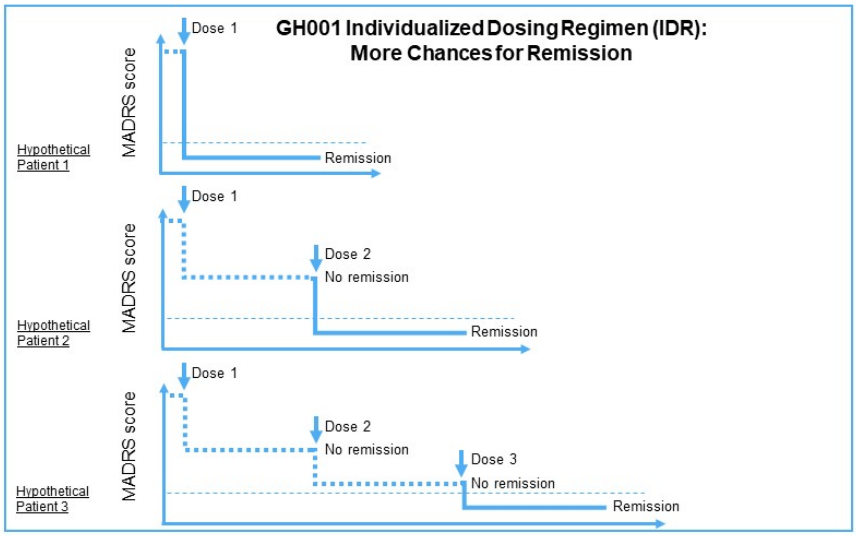
- GH001 single doses of 2 mg, 6 mg, 12 mg, 18 mg and GH001 IDR (6, 12, 18 mg intra-subject dose escalation)
- **No SAEs, all ADRs mild (except two moderate), all ADRs resolved spontaneously, inhalation well-tolerated**
- GH001 single dose with psychoactive effect dose response but high inter-subject variability
- **GH001 IDR controls inter-subject variability achieving a PE[1] in all healthy volunteers**



Clinicaltrials.gov ID NCT04640831; Reckweg et al, 2021
IDR, Individualized Dosing Regimen; SAE, Serious Adverse Event; ADR, Adverse Drug Reaction (an adverse event with a relationship code to the investigational product of definite, probable, or possible, or where code is missing).

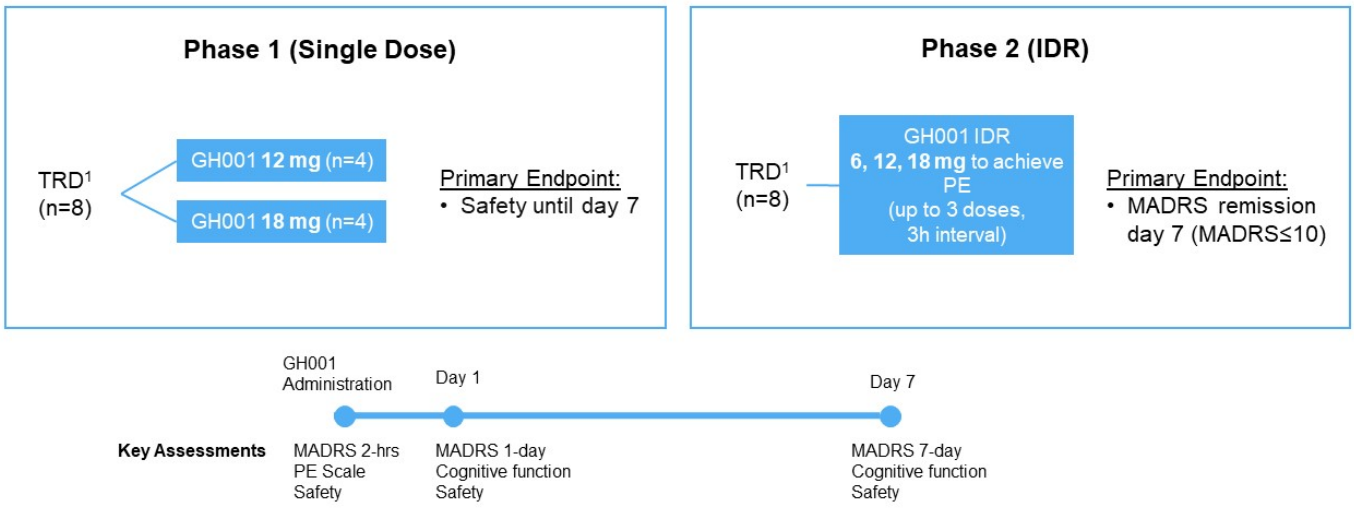
GH001 – Individualized Dosing Regimen (IDR) Designed to Achieve Ultra-Rapid and Durable Remissions





MADRS, Montgomery-Åsberg Depression Rating Scale

Phase 1/2 Trial in TRD (GH001-TRD-102, n=16)

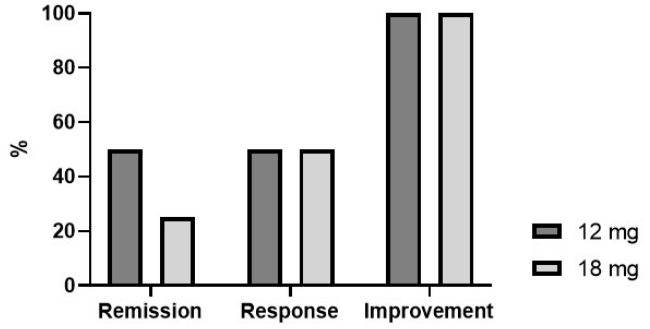


PE, Peak Experience; MADRS, Montgomery-Åsberg Depression Rating Scale; IDR, Individualized Dosing Regimen

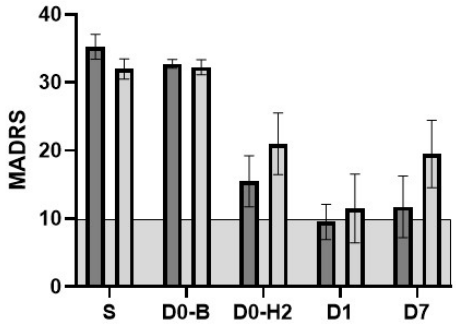
[1] *Defined as inadequate response to at least two adequate courses of pharmacological therapy or one adequate course of pharmacological therapy and at least one adequate course of evidence-based psychotherapy*

Phase 1 (Single Dose) – Efficacy (MADRS)

MADRS Remission, Response, Improvement Rate at Day 7



MADRS from Screening to Day 7

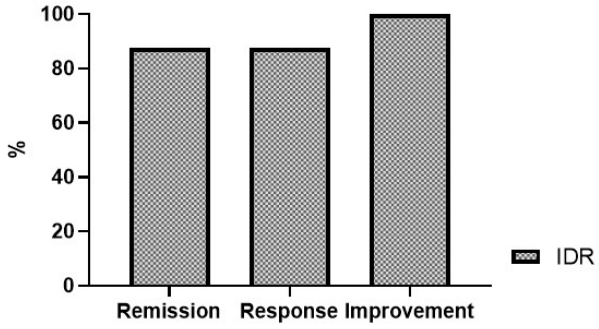


- 2 of 4 patients in the 12 mg group and 1 of 4 patients in the 18 mg group had a MADRS remission at day 7
- 2 of 4 patients in the 12 mg group had a PE and both had a MADRS remission at day 7,
  0 of 4 patients in the 18 mg group had a PE

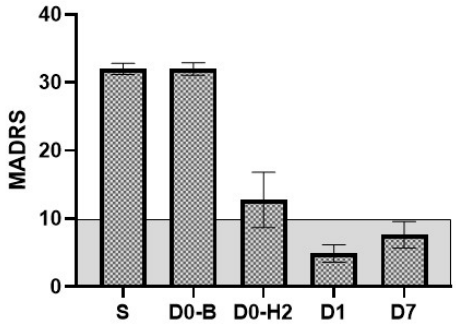
PE, Peak Experience; MADRS, Montgomery-Åsberg Depression Rating Scale, MADRS remission, MADRS of ≤10; MADRS response, Reduction of ≥50% from baseline in MADRS; S, Screening; D0-B, Day 0 Baseline; D0-H2, Day 0 2 hours.

Phase 2 (IDR) – Efficacy (MADRS)

MADRS Remission, Response, Improvement Rate at Day 7



MADRS from Screening to Day 7



- **Primary endpoint met:** 7 of 8 patients (87.5%) had a MADRS remission at day 7, p<0.0001
- 7 of 8 patients had a PE and 6 of those had a MADRS remission at day 7

PE, Peak Experience; MADRS, Montgomery-Åsberg Depression Rating Scale; MADRS remission, MADRS of ≤10; MADRS response, Reduction of ≥50% from baseline in MADRS; S, Screening; D0-B, Day 0 Baseline; D0-H2, Day 0 2 hours.

Phase 1 (Single Dose) and Phase 2 (IDR) – Safety

Study Safety Group review

- **No SAEs**
- **All ADRs mild, except three moderate***
- **All ADRs resolved spontaneously**
- **Inhalation well-tolerated**
- No noteworthy changes in vital parameters, except for temporary, non-clinically relevant increase in heart rate and blood pressure shortly after administration of GH001
- No clinically significant changes in safety laboratory analyses, psychiatric safety assessments or measures of cognitive function
- No safety signal relating to suicidal ideation or suicidal behavior, based on C-SSRS and MADRS subscore item "suicidal thoughts"

ADRs	Phase 1 (Single Dose)		Phase 2 (IDR)
	12 mg (N=4)	18 mg (N=4)	IDR[1] (N=8)
MedDRA Preferred Term	n	n	n
Abdominal discomfort			1
Anxiety			2
Depressive symptom			1*
Dizziness	1		
Feeling abnormal	1	1	
Flashback	1	1	2
Headache	2	1	3
Muscle discomfort			1
Muscle spasms		1	
Nausea			2*
Paresthesia			1
Sensory disturbance			3

Adverse Drug Reaction, or ADR, an adverse event with a relationship code to the investigational product of definite, probable, or possible, or where code is missing
IDR, Individualized Dosing Regimen; C-SSRS, Columbia-Suicide Severity Rating Scale

[1] 6-12 mg (N=6); 6-12-18 mg (N=2)

Conclusions

- GH001 allows **rapid and individualized dosing optimization**
- A single dosing day with GH001 IDR achieved **a rapid (within 24 hours) and sustained full remission (7 days)** of symptoms of depression in 7/8 patients (87.5%) with TRD
- GH001 was **well tolerated,** and no serious adverse events were reported

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A Phase 1, Dose-Ranging Trial to Assess the Safety and Psychoactive Effects of a Vaporized 5-Methoxy-N,N-Dimethyltryptamine Formulation (GH001) in Healthy Volunteers

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INTRODUCTION

5-Methoxy-N,N-Dimethyltryptamine (5-MeO-DMT) is a potent, fast-acting, naturally-occurring psychoactive tryptamine[1]. It is predominantly found in the bufotoxin of the Sonoran Desert toad[2] and was first synthesized in 1936[3]. It acts on the 5-HT1A and 5-HT2A receptors, and it has been suggested that the 5-HT1A subtype is functionally dominant[4]. 5-MeO-DMT has been used in recreational or self-exploratory contexts[2].

5-MeO-DMT has been reported to be proficient in eliciting so called peak psychedelic experiences (PE). These are states during an intense psychedelic experience that are defined by feelings of ego dissolution and experiences of oneness or unity. These can be very profound and meaningful experiences, which may correlate with therapeutic outcomes.

In the current study, 5-MeO-DMT was administered via inhalation as GH001, a novel vaporized 5-MeO-DMT formulation.

AIMS

The primary aim of the study was to investigate safety, tolerability and dose-related psychoactive effects of GH001 in healthy volunteers. Additional aims were to assess the impact of GH001 on cognition, mood, and well-being, as well as to determine the best dosing regimen to reliably elicit a PE.

METHODS

The study was comprised of two single-arm parts, where Part A (n=18) consisted of four single dose levels (2 mg, 6 mg, 12 mg, 18 mg).
Part B (n=4) was comprised of an individualized dosing regimen (IDR), of up to three increasing doses on a single day (6 mg, 12 mg, 18 mg). The part B consecutive doses were only administered if the previous dose did not elicit a PE. This was assessed using a proprietary novel PE scale (PES), consisting of 3 visual analogue scales. Aside from a (medical) screening and the single administration day, follow up visits were conducted on day 1 and day 7 after the dosing day.

A total of 22 healthy volunteers (9 female, 13 male) aged 18 to 42 years (*M*=29, *SD*=6.08) with a history of prior psychedelic use participated in the study.
To avoid expectancy effects, participants were not informed about the identity of the study drug until completion of the study.

Measures of the psychedelic experience (PES, EDI, MEQ, CEQ, 5D-ASC) were analyzed using ANOVAs with single factor *Dose* (5 levels: 2, 6, 12, 18 mg and IDR).
The cognitive tests (DSST, PVT, PMT), measures of well-being (DASS-21, SWLS, FFMQ, CADSS, BPRS), and vital signs were analysed using GLM RM-ANOVAs with the factors *Dose* (5 levels) and *Time* (3 levels: Baseline, post-administration, 7-day follow up).

RESULTS

Psychedelic experience

ANOVAs indicated a significant effect of 5-MeO-DMT *Dose* on ratings of the PES ($F_{4,17}$ = 9.302, p < .001, η_p^2 = 0.686), EDI ($F_{4,17}$ = 6.925, p = .002, η_p^2 = 0.62), MEQ ($F_{4,17}$ = 8.026, p = .001, η_p^2 = 0.654), and Reduction of Vigilance as assessed with the 5D-ASC ($F_{4,17}$ = 4.023, p = .018, η_p^2 = 0.486). The effects of dose on ratings of Oceanic Boundlessness approached significance ($F_{4,17}$ = 2.901, p = .053, η_p^2 = 0.406). Planned contrasts indicated higher mean ratings of the psychedelic experience at higher doses compared to the lowest dose of 2 mg.

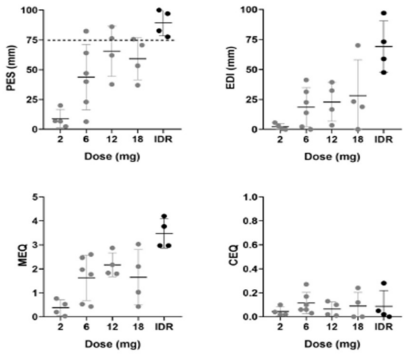

Figure 1 Mean (SE) and individual retrospective ratings of the acute psychedelic experience (PES, EDI, MEQ, CEQ) per dose level. *Average of ≥75 on PES indicated a PE.*

In part A, four participants reported a peak experience (i.e., PES rating ≥75%): one participant at the 6 mg dose, two participants at the 12 mg dose, one participant at the 18 mg dose. In part B, all four participants in the IDR group reached a PE; one participant after first dose (6 mg), two after second dose (6 mg + 12 mg), and one participant after three doses (6 mg + 12 mg + 18 mg).

Cognition and well-being

For the measures on cognition and well-being, no clinically relevant effects of *Dose* or *TimexDose* were observed. The factor *Time* reached significance for the SLWS, BPRS, and the Amnesia and Derealization subscales of the CADSS.

Safety and tolerability

All doses were considered safe and well-tolerated. There were no dropouts and no serious adverse events (AEs) reported. There were two AEs of moderate severity (fatigue, heart rate increase) with all other AEs being mild (e.g. nausea, headache, anxiety), and all AEs resolved spontaneously.
There were no significant effects of *Dose* on measures of systolic/diastolic blood pressure or heart rate and only a non-clinically significant effect of *Time* (p=.003), reflecting a mild decrease in heart rate from baseline to 3 hours post-administration (heart rate remained within normal range).

Plasma concentrations

Plasma concentrations of 5-MeO-DMT were very low at 1 hour post-administration and barely measureable at 3 hours post-administration. Bufotenin concentrations were below limit of detection (0.006 ng/ml) at all time points.

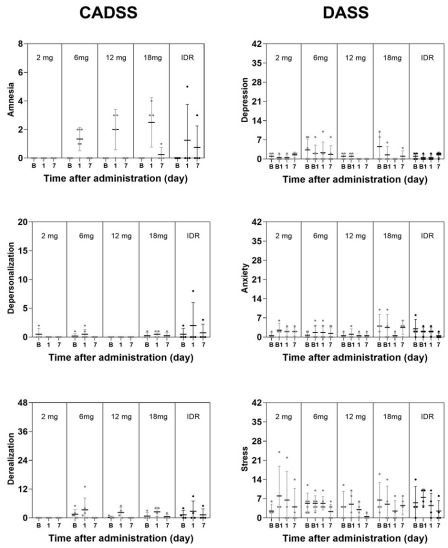

Figure 2 Mean (SE) and individual CADSS and DASS ratings per dose level.

CONCLUSION

-Administration of GH001 was well tolerated
-Short duration of effects support safety profile
-Individual variability for dose-related effects
→ IDR may be preferable for clinical applications that aim to optimize therapeutic response

References

[1]Shulgin, A., and Shulgin, A. (1997). *Tryptamines I Have Known and Loved: The Chemistry Continues*. Berkeley, CA: Transform Press.
[2]Weil, A. T., & Davis, W. (1994). Bufo alvarius: A potent hallucinogen of animal origin. *Journal of Ethnopharmacology*, **41**, 1–8.
[3]Hoshino, T., and Shimodaira, K. (1936). Über Die Synthese Des Bufotenin-Methyl-Äthers (5-Methoxy-N-Dimethyl-Tryptamin) Und Bufotenins (Synthesen in Der Indol-Gruppe. Xv). *Bull. Chem. Soc. Jpn.* 11, 221–224. doi:10.1246/bcsj.11.221
[4]Krebs-Thomson, K., Ruiz, E. M., Masten, V., Buell, M., and Geyer, M. A. (2006). The Roles of 5-HT1A and 5-HT2 Receptors in the Effects of 5-MeO-DMT on Locomotor Activity and Prepulse Inhibition in Rats. *Psychopharmacology (Berl)*. 189, 319–329. doi:10.1007/s00213-006-0566-1

Disclosure statement: The study was funded by GH Research, Dublin, Ireland

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